



Legacy 00-0106

***H.L. Hunley Recovery
Project***

**International
Archaeological Lifts,
L.L.C.**

**A PROPOSAL TO SAFELY RECOVER
THE H.L. HUNLEY SUBMARINE
LOCATED IN CHARLESTON, SOUTH CAROLINA**

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ABSTRACT

International Archaeological Lifts,L.L.C. (IAL) proposes a safer alternative method to raise the Civil War submarine H.L. Hunley from the plan that is currently scheduled.

New information (November 1999) about the design, pattern and level of corrosion of the rivets of the H.L. Hunley submarine suggests that there are serious risks for its safe recovery if the currently proposed method of recovery is implemented. In fact, based on our engineering evaluations, a deformation of the body of the submarine will occur that will separate the seams and cause the hull of the submarine to collapse.

International Archaeological Lifts, L.L.C. (IAL) is proposing a safer method of recovery that is based on the principle that the submarine is a fragile artifact with no structural integrity rather than the currently proposed lifting procedure that uses a series of straps as a primary support. The IAL proposal relies on a mechanical device that essentially scoops the submarine with its surrounding sediment and recovers the submarine in its original and uniformly supporting sediments.

Engineering and structural concerns with the currently proposed method are outlined and the multiple advantages to the IAL approach will be explained.

The proposal includes the background of IAL and the IAL Group and a time table for construction, testing, demonstration and the actual recovery of the Hunley that meets the currently proposed schedule for a recovery in June/ July of 2000.

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INTRODUCTION

Since the discovery of the Civil War submarine H.L. Hunley the plans for its preservation have served as an example for how to carefully proceed on projects of such importance. Plans for the recovery, conservation facility and archaeological excavation have progressed and a recovery of the Hunley is scheduled for June/July 2000. All of these exciting advances have gotten the ball rolling and it is hoped that the wisdom of Edwin Bearss, National Park Service-Research Historian should be heeded. His book, Hardluck Ironclad, tells the story of the almost successful, yet destructive, recovery of the Civil War ironclad Cairo. In his book, he warns "Momentum was the foremost cause of damage to the ironclad" (paraphrased with permission, personal comm.12/12/99). This statement refers to the decisions that were made and warnings that were not considered during the attempted recovery of the Cairo which went forward with good intentions and disastrous results.

In an effort to avoid the mistakes of the past, I have endeavored to present the Hunley Commission with the following evaluation of their proposed method of recovery. It is hoped that they may pause, and carefully consider this analysis and what the possible outcome may be if they proceed as currently planned. Pointing out these problems is clearly my professional responsibility as a knowledgeable archaeologist with expertise in this area and for the safety of the archaeologists and divers. The analysis that is presented is done as objectively as possible. I strongly encourage several outside evaluations or second opinions to confirm our findings. As an archaeologist and a problem solver, I also consider it a responsibility when pointing out a problem to a colleague that assistance should be offered to solve the problem as well. To that end, the following proposal describes a step by step process for a safer and more advantageous method to recover the Hunley.

BACKGROUND of INTERNATIONAL ARCHAEOLOGICAL LIFTS, L.L.C.

International Archaeological Lifts, L.L.C. was formed as a Mississippi corporation to implement a comprehensive plan for the recovery of intact shipwrecks sites and their archaeological excavation and exhibition worldwide. International Archaeological Consultants (IAC) is a separate entity and is wholly owned by Robert M. Adams who serves as President and Principal Archaeologist. Archaeological projects and participation undertaken by IAC since 1990 include both underwater and terrestrial projects from the mitigation of prehistoric rock shelters to the complete excavation of historic home sites and underwater work in several countries including Colombia, Turks and Caicos and the Cayman Islands. During my 21 years as an archaeologist, I have worked on many shipwrecks from a 3rd century B.C. in the Mediterranean to a 20th century shipwreck in the Gulf of Mexico. It is this wide ranging experiences from working in zero visibility on steamboats to under financed projects in foreign countries that have helped define a comprehensive concept for the recovery of entire shipwreck sites.

My formal interest in the recovery of entire shipwreck sites began after attending Texas A & M Universities-Nautical Archaeology Program and while working on the Yorktown Shipwreck Archaeology Project in 1984. The project was the excavation of a British vessel that was intentionally scuttled at the end of the Revolutionary War at Yorktown and was being excavated within a cofferdam in the York River. A pier was built out to the cofferdam so that when the water was clarified visitors could witness active underwater archaeology. Although the water was clarified for short periods of time, the ill conceived idea that the public could see black hull remains against black mud from 10 feet above the water surface and at an average depth of 20 feet below the water surface made the success of the concept impossible. This project had most of the criteria for a successful project including easy access in an area with high visitation and active diving but the inability to see the work close-up was its limiting factor.

Preparation to launch the idea of recovering intact shipwreck sites began with a draft business plan in 1993. Difficulties in financing an independent market analysis and engineering refinements slowed the business process. In July 1995, a working prototype capable of demonstrating the principle was completed. I delivered a paper at The Society for Historical Archaeology-Conference for Historical and Underwater Archaeology in Corpus Christi, Texas nearly three years ago. This presentation "The Future of Underwater Archaeology: A recovery device for retrieving submerged archaeological sites intact and the related excavation facility" (Appendix D) details the financial potential of shipwrecks being excavated in high visitation areas, particularly at aquariums with established visitation. It also showed the advantages to the archaeological community in terms of stable employment, higher standards and new technological and research developments. The presentation on December 20th at the Charleston Museum included architectural drawings for a combined excavation, conservation, and curation and exhibition facility similar to what could be applied to the Hunley project. This concept was an integral part of a comprehensive plan for the recovery and archaeology of the Hunley expressed in a letter of interest (October 1998) in response to the Dept. of Navy Request for Proposal -7/16/98.

IAC has continued to offer its expertise and has consulted on another large scale project by assisting with business proposal development for the recovery, display and underwater excavation of the Dutch East Indiamen Amsterdam lost near Hastings, England. This plan is to bring the Amsterdam home to Amsterdam, (which weighs more than a 1,000 tons) has an estimated recovery cost of 17 million dollars. Although the overall cost of the project exceeds 100 million dollars and is a far more costly and complex undertaking, it has many parallels to the Hunley project.

Members of the IAL Group

Pan American Maritime L.L.C. (Pan American) of Memphis, Tennessee is a subsidiary of Pan-American Consultants, Inc. of Tuscaloosa, Alabama. They will help to accomplish the underwater work related to the testing, demonstration and recovery phases of our plan. Steve James, President of (PanAmerican Maritime) and IAC were partners in the original proposal submitted in October 1998 and he was instrumental in defining the archaeological methods and procedures contained in that proposal. Since the Hunley Research

Center will complete the archaeology, Pan American is serving as a member of our group to assist in the implementation of the recovery.

Pan American is the largest maritime archaeological firm in the country. They have undertaken a vast range of projects from the inland waterways of the U.S. to projects in the South Pacific and the Caribbean and has worked closely with the U.S. Navy. They have assembled a group of the most experienced and skilled archaeologists in the country and have more experience in the use of commercial diving equipment in adverse conditions than most commercial divers.

Pan American, has worked in a number of foreign countries and over 20 states and has a great deal of experience in the recovery of artifacts, both small and very large, from underwater contexts. A major portion of their work occurs in inland waterways where currents and absolute zero visibility make the job more difficult. The visibility and the current that is present at the Hunley will not pose a problem for Pan American.

One member of the Pan American team, Richard Swete, is a graduate of Texas A & M-Nautical Program and is a doctoral candidate in History at the College of William and Mary. He has worked throughout the United States and many foreign countries and has been responsible for the recovery of hull or hull remains from Maine to the Falkland Islands. His recoveries include a variety of remains from an intact indigenous canoe in Maine to the recovery of the 43 ton bow of the Snow Squall in the Falkland Islands. Dick is a retired Army Captain and has worked with military assets and commands in his underwater work including U.S. Navy, U.S. Army and British Royal Engineer divers and their associated assets and Commands on numerous occasions.

Laurence and Associates is regarded as the foremost structural engineering firm in Corpus Christi. The firm's President and CEO, Jimmy L. Laurence, have over 19 years experience as a licensed structural engineer. The firm of Laurence and Associates is the direct successor to the firm of McElroy and Larson after the retirement of Mr. McElroy in 1996. He has a number of qualifications that have made him perfectly qualified to assist in this project. During his years in Engineering School he was employed as a research Technician at UT Balcones Laboratory and exposed to new and innovative hydraulic systems. He also worked through a portion of those years as a commercial diver. He has been employed as an engineer in steel fabrication an essential element of the current project. A final qualification is his design work on the Texas State Aquarium in Corpus Christi, including the construction of the new dolphin tank and exhibit. All of these qualifications coupled with an interest in history have made his expertise an invaluable asset to the project.

William P. Ogletree P.E. is a licensed engineer with 46 years experience including 32 years as an owner of an engineering firm with offices in New Orleans, LA and Corpus Christi, Texas. He has extensive experience in marine and naval engineering, including concrete and steel projects, bridges, piers, dry docks, vessel cradles, special service barges, drilling masts etc. etc. He has worked with the Texas Historical Commission, Marine Science Institute-University of Texas, with the port Authorities of New Orleans, Corpus Christi and Brownsville and with the U.S. Navy, NAS Corpus Christi and U.S. Navy, NAVFAC COM-Chesapeake Division. He has also served as Assistant Professor at Del Mar College for five years.

Mr. Michael Garvey and Mr. Ted Price, Sr. Co-owners of the Crane Co. in Columbia, South Carolina and between the two of them have 79 years of experience, that includes erecting the world's largest gantry crane three times, once for Westinghouse Tenneco and twice for Newport New Shipbuilding. They have dismantled Launch Pad 34 at Cape Kennedy and revamped the launch pad for the Space Shuttle. The Crane Co. is one of South Carolina's largest and most experienced, with cranes available up to 365 tons. They have a complete shop of millwrights and riggers and are considered one the best crane companies in the southeast. They have worked with the South Carolina Institute of Archaeology and have a clear understanding of archaeological needs and concerns, having moved the remains of the Brown's Ferry wreck six times. They are also called upon by the State Museum in Columbia when special caution is needed to move exhibits, such as the Hunley replica. This knowledge and experience adds a great asset to our group.

Stevens Towing Co. is the largest barge transportation company in the Charleston area. It will be responsible for providing the required barge, mooring, and towing capabilities during the recovery. The size, experience and history of the company make them the best selection for marine support and they have worked with the Crane Company on past projects.

CONCERNS WITH THE CURRENTLY PROPOSED METHOD OF RECOVERY

Review of currently proposed method

The currently proposed method to recover the Hunley was evaluated based upon the graphics and description presented during the opening remarks of the Conservation Symposium, brief discussions with a company representative of Oceaneering Advanced Technologies (Oceaneering) and from information gleaned during discussions at the Symposium. I did not attend the formal presentation of their plan at the Conservation Symposium since I felt that there may have been proprietary information disclosed and that it would be inappropriate as a competitor for the recovery.

I will begin by presenting my understanding of the step by step approach proposed to recover the Hunley. I will qualify our analysis by stating that it is based upon my understanding of their design or procedure. Our review and analysis should be checked against the actual planned methods and designs, and verified by other independent engineers.

Oceaneering's preparatory requirements for the recovery plan include the excavation of the sediment surrounding the Hunley, to an unspecified level that exposes the majority of the submarine. At the Conservation Symposium, this step was referred to as "pedestalling" a common archaeological procedure used before undercutting a given object to preserve its position in situ while proceeding to deeper strata. The archaeological purpose of this sediment removal is to gain information regarding site formation processes and to explore as yet undefined research objectives. The purpose for the procedure is to reduce the amount of overburden in order to allow straps to be maneuvered under the hull.

The essential description of the lifting plan is that a rectangular frame or spreader with two sides is to be supported on piles driven into the sea floor to support the spreader just above the submarine. Sediment will then be cleared from under the hull, beginning at one end, as each lifting strap is placed underneath the hull and tensioned to the frame. The type of foam and pillows which would be used in the process of padding the straps had not been decided at the time of the symposium. This strapping process is planned to begin from the bow, with the straps placed a maximum of 12 inches apart. The space between the straps is to be filled with a series of interwoven or Velcro straps in order to form a continuous sling under the Hunley.

Once all the straps are in place and tensioned, additional tunneling or clearing would be done in order to install a cross piece to complete the bottom of the cage or truss system, referred to as a "space frame". After completion of the frame, the supporting piers would be cut off and the Hunley lifted to the surface and placed on the waiting deck for transport to the conservation facility.

Concerns with the Current Recovery Plan

The approach currently proposed is a very different approach than that designed by IAL. Over the years and recently with the Hunley in mind, IAL has studied many options for the recovery of ship remains. All of these options have advantages and shortcomings. Assessing these parameters has led to very different conclusions. We begin with a few basic tenets or principles.

The goal in engineering, in any given design, is to meet the parameters or goals of a particular project. I have not heard design parameters expressed or quantified for the recovery of the Hunley. During the Conservation Symposium, when the issue of the amount of deflection there would be along the length of the frame? the answer was about an inch. The obvious question is, Does that amount exceed the design parameters or, in laymen's terms, is that too much deflection? It was understandable that none of the Symposium participants as conservators appeared to understand the rigidity of the Hunley, the modulus of steel, or the effect of such a deflection on the Hunley.

In trying to evaluate the parameters for the safe recovery, there are two sets of parameters.....archaeological parameters and salvage parameters. Salvage parameters are often considered successful if the given object makes it from the bottom to the deck. If a strap or sling moves, or

the object slides in the sling, it is not important, so long as all the pieces of the object get from the bottom to the deck. Archaeological parameters on the other hand are far more specific and the outcome is usually very clear if such parameters have been met, particularly to the conservator and to the archaeologist.

A parameter that has been not been clearly expressed, which is clearly implied is that all of the Hunley, its parts and contents, must be contained with no visible loss of sediment artifacts or parts and pieces. This is a very low threshold or minim standard parameter. If the bar were raised for example more in line with archaeological parameters, then the requirements would include no movement in the Hunley that would further degrade its condition. This parameter would also allow the option of having an intact hull for electrolytic or hydrogen reduction. More importantly, the complete reconstruction of the hull should not be mandated at the time of the lift. This is our understanding and the approach that was taken by IAL not only in our evaluation but also in our plan.

We approached the problem as an archaeological recovery of a fragile artifact, and not as a salvage or ship recovery. The key, to the recovery lies in a fundamental archaeological practice--When you are excavating a fragile artifact, you don't put slings under it and expect it to stay together; you pedestal the soil around the object, undercut the pedestal and remove the object that is uniformly supported by the soil. The same principle applies to the Hunley except in its size and the method required to undercut the sediment.

One further engineering principle that is fundamental is----If you don't know something, you don't assume it. This principal applies throughout our evaluation and permeates our plan for the recovery. If we don't know the structural strength of the rivets, we don't assume it's 10% or even 2%. If you believe that the hull thickness was originally 3/8 inch and in areas it is known to have degraded/ corroded by a mere 1/16 inch, we reduce the hull thickness by 17% and use this lower thickness in our calculation.

With the preceding concepts and parameters identified, our first and greatest concern is for the planned excavation around the exterior of the Hunley. This process of removing sediment from around the Hunley poses a very great risk because of the differential pressures. These pressures manifest themselves in several ways and their resultant actions of these forces are critical. In its current position the sediment inside the Hunley equals that outside the submarine. If this sediment is removed around the exterior, as is planned to record the hull before lifting, the difference in pressure will be equal to the weight of the sediment being exerted both as a force of gravity and as a lateral force from the interior of the submarine.

In the case of the Hunley, we are aware that it was originally designed, in engineering terms, as a thin-walled pressure vessel, or, in laymen's terms as "standard boiler" construction. When the sediments are removed from around the exterior of the submarine the "thin walled pressure vessel" is not designed for the unequal pressures exerted by the sediment contained inside.

When calculating the forces or pressures which are acting upon the hull of the Hunley at the current time it is important to understand the direction or vectors of those forces, any combination of those forces. The precise density of the sediment contained in the Hunley is still unknown, but the estimate of sediment weight or force after adjustments for interstitial water spaces and the displacement of seawater, is estimated at 80 lbs. per cubic foot. If this weight of sediment is removed from around the outside of the submarine so that almost all of the submarine is exposed, there will be forces of gravity acting upon the sediment and lateral forces acting upon the hull. For engineering and recovery purposes, the riveted strength of the submarine should be assumed to be zero. This conservative assumption is based on the new information gained during investigation of the Hunley in November 1999. During this investigation a highly corroded core of a rivet was pulled out by hand. Based upon this finding, it must be assumed that the rest of the rivets are in this condition, those used in association with cast iron applications may be even further deteriorated.

The historical significance to the Civil War, to Charleston, to the descendants of men who gave their lives and to many others who recognize the significance of the Hunley as a War Grave mandate that the recovery err on the side of conservative engineering. The removal of the rivet core by hand demonstrates that there is no structural strength being added to the structure from the rivets in their current corroded condition. From this premise the structure of the Hunley, although slightly oblate, can be viewed as two separate

hemispheres. The sediment contained inside the submarine act, as a fluid exerting both lateral pressures and the force of gravity acting downward on the bottom portion of the submarine will cause a deflection. Visualize the bottom half of the submarine as a long hemispherical trough with sediment piled on top in a perfect hemispherical form. This amount of movement will separate the seams and leave two independent spheres which may act to push the expansion plates free from the hull. The sediment within the hull, because of its fine particle size and aqueous matrix, behaves as a fluid and the action of force/ deformation on the submarine hull will cause the sediment to flow. The sediment filled hull will cause of the top half of the vessel to lift upwards. Because of the current position of the submarine at a 45-degree angle gravity will cause the top of the submarine to slide downward. From this point it is no longer a static calculation and the dynamic results become complex. It can be safely said the results will be, archaeologically catastrophic.

Based on our engineering evaluation, the Hunley will collapse if the surrounding sediments are removed. If there is more inherent strength in the rivets than estimated and the frame is lowered into position around the Hunley without it collapsing, then the undermining of the hull, starting at one end, to allow the straps to be placed under the hull, may trigger the collapse.

This characteristic of a cohesionless soil also precludes the idea of placing a frame to support the straps on the surface of the sediment with sufficient surface area to support the frame then attempting to remove the sediment from around the hull beginning at one end. If this method were attempted, you would be excavating a hole at the bow of the submarine that would be approximately five feet deep to accommodate the straps and pillow padding. It must be remembered that just because a sediment may hold a vertical wall near the submarine, it is not the same as a sediment that is under load. If a five foot deep hole was excavated from the surface to a depth 12 inches below the Hunley and the sediment was assumed to have a maximum 10 degree angle of repose under load, as soon as the bow was exposed with 12 inches of clearance underneath it, this would effectively leave approximately 30 feet of the length of the submarine unsupported. If a series of straps were excavated at the bow without collapse perhaps for 1/8 of the length of the submarine (5 feet) the submarine and the frame would then be structurally tied together only partially. The point of load bearing would then be aft of the submarine itself, resulting in an unsupported submarine but partially attached to the frame with disastrous loads placed on the submarine even before a collapse would occur. If a five foot deep hole were excavated under the center of the submarine, it would have the same 10 degree angle of repose in all directions leaving the submarine with no actual bearing surface for 30 feet each direction. Understanding that when active lateral pressures overcome the lateral passive resistant pressure the soil will fluidize and flow. Not only would this exceed OSHA Trench Shoring requirements, it is by far the most dangerous concept that I can imagine. It can be seen that trying to work in this type of cohesionless soil below the level of a heavy object that causes liquification is like trying to excavate down in bowl of water.

Another concern would be for the potential loss of archaeological information from the process of clearing sediment from near the base and under the hull. Two artifact groups may be present; those from the Housatonic that are the earliest and most contemporaneous and 2) artifacts from the Hunley if a breach in the hull is found. The first artifact group may represent the earliest deposits from the Housatonic, associated with items from the sinking. For example, items of just slightly negative buoyancy may have been deposited by the traction load movements from the currents that were trapped against the hull, such as clothing, hardwoods or metal/wood composites or the first depositions of coal, within days or weeks of the sinking. These deposits should be easily distinguishable from later deposits that may be the result of the 1909 razing process, or earlier site formation events. It would be a shame if a great amount of effort were expended to excavate the upper areas of sediment and potentially the most informative and perhaps artifact rich areas directly against the hull at its base were lost by salvage divers activities.

The second group consists of artifacts from the Hunley itself that may have been deposited from a breach in the hull. The scenario for the possible breach in the hull comes from the current attitude of the Hunley heeled 45 degrees. This position suggests that the Hunley has found its most stable position. Without an in-depth analysis of the concretion and marine growth on the exterior of the hull it will be difficult to ascertain whether the submarine, once buried, was not occasionally, unburied by severe storm action. During the initial presentation, Dr. Donny Hamilton remarked to me that the Hunley may have been exposed at least

once from the appearxposed at least once from the appearance of a small mollusc that was attached to what may have been the original concretion, suggesting a second exposure to open water. Sequences of burial and reburial are often difficult to ascertain and we will focus on what is believed to be a period of 15-20 years for complete burial. If sedimentation and burial rates for the submarine are that low, that leaves an unknown period of time when the submarine may have been exposed and as a result of storm action its complete burial may have been slowed or reversed. The most critical area of the hull that may have a breach in the hull is the longitudinal line along the hull where it contacts the sand This is the area most exposed to scour and to movement or rocking under heavy surge conditions. The essential element in either surge or scouring scenarios is the repeated exposure of fresh metal after sea life or corrosion products have been worn off from abrasion. It is possible that the Hunley sank immediately and has sat permanently stable on the bottom so that surge or scouring never effected the hull. If these other factors combined and the hull repeatedly abraded to fresh metal surface, however, the corrosion could be significant.

The reason that these scenarios must be considered is that the same area that would be subject to abrasion and accelerated corrosion of the vessel on the exterior of the hull, is the same location where all unattached artifacts would come to rest on the interior of the Hunley. If the submarine had been subjected to any significant movement artifacts will be concentrated in this location. If this area corroded enough to cause a breach in the hull, artifacts would be directly above these holes and they could fall through during the proposed procedure. This sequence of events may not have occurred, but it would be tragic to discover this only after a breach is encountered and material has already been dispersed. Admittedly, the reality that the information surrounding the base of Hunley, if present, may not answer any great research objectives and the chance of artifact loss even if a breach in the hull is encountered is minimal but the possibility does exist. The purpose of this discussion is to point out that our method which captures the surrounding sediment, eliminates these possibilities, suggesting yet another advantage to our method.

The safe recovery of the propeller and rudder assembly that protrude aft of the Hunley was a topic of some concern at the Conservation Symposium, and the method to stabilize these interconnected features remained unresolved. Several methods from straps to foam pillows were suggested, as was the concept of completely foaming the assembly. It was also suggested that if the stern area and its components could not be adequately stabilized, that the assembly could be easily cut off and recovered separately. All of these efforts with straps and foam are designed to mimic the uniformly packed one millimeter sized particles of sand that are currently in place. Although cutting off the assembly may be justifiable under some conditions, it appears to us that a proposed 2.3 million-dollar recovery should have higher standards. Once again, our method that recovers the sediment intact eliminates these concerns and is a superior method that is more visually appealing to the waiting public than a multitude of straps, bags and foam hanging from the proposed frame.

There is one last scenario which should suggest a reconsideraton of the recovery with straps. If a breach in the hull is encountered when excavating materials under the hull there will be a flow of materials that will exit the hull. If this breach is detected it will be difficult to repair or plug the breach underwater based on my experience of using miles of marine epoxies and caulking in an attempt to seal the Yorktown shipwreck cofferdam. The real problem comes as the submarine in the frame passes from the water into the air and losses it buoyant displacement. The increase in weight of 26,000 lbs. (13 tons) will change lengths of the straps and increase pressures on seams and the hull dramatically. At this point the fluid in the submarine, a combination of water and very fine sand, will attempt to drain. Any breach in the hull including rudder plane seals, propeller seal, two sea (cocks if in the open position), rudder actuating rods, and perhaps most vulnerable, keel ballast bolts and stuffing boxes are potential sources for leakage. A small breach in the hull at or near its lowest point could result in draining the entire contents of the submarine including artifacts in a matter of minutes.

In conclusion, our analysis has shown that the proposed approach induces added hull stress, probable hull failure, lost archaeological information, lower visual appeal to the public and possible catastrophic drainage. We strongly believe that exposing the submarine with the current approach will result in its structural collapse. If the submarine survives this initial step, it may not survive the sediment removal under the submarine or the inability to accurately tension the straps. If the structural collapse of the submarine has

not occurred after these actions, when the buoyant force is removed at the air-water interface, the collapse of the submarine under its own weight is all but guaranteed. Even if the Hunley could survive all these forces, we are offering a far better method for recovery that eliminates many of the concerns that are manifested by the use of the strapping system. The procedure of removing sediment around the Hunley to facilitate strapping, recording or other investigation should not be done because of the character of the sediments and the potential risks involved. On an archaeological, engineering and a visual appeal level, using straps to support the hull of the submarine for the lift and transport is fundamentally a very bad idea and should not be considered as an option.

IAL RECOVERY PLAN AND PROCEDURES

Preliminary Requirements

During the recent Conservation Symposium, a preliminary archaeological plan to excavate the sediment surround the Hunley and to pedestal the submarine as part of the preparation for the recovery was mentioned. In our plan, the excavation will be limited to a depth of approximately seven inches below the top of the body of the submarine.

An area of 56 feet in length and 20 feet in width (with the submarine centered within that area) will be required for our work area and at the same time will allow the archaeology of the upper sediments to be undertaken. In our original plan in our letter of October 1998 we proposed a light duty cofferdam essentially to reduce the size of the area to be excavated and to improve archaeological control of the excavation may be useful but is not required.

As part of the excavation it will be necessary to groundtruth the three magnetic anomalies that have been identified in close proximity to the Hunley. This identification will probably require the recovery of these objects before proceeding with our lifting procedure.

Additionally, buoys or PVC markers to delineate the bow and the stern extremities and a baseline running the along the center axis of the Hunley would be helpful. These minor details will most probably be established as necessary reference points during the archaeological removal of the upper sediments.

All of these requirements can be undertaken by IAL as a portion of the recovery contract if they are not undertaken by Hunley Research Center personnel.

Lifting Components

There are three basic components that will be used to complete the recovery of the Hunley: 1) The lifting cradle, composed of a series of hydraulically actuated plates for removing the submarine and its surrounding sediments, 2) two guide towers placed at each end of the long axis of the submarine to support and preposition the lifting and 3) the lifting tray where the submarine and it accompanying sediment will be deposited before being lifted to the surface.

Before the lifting cradle can be positioned over the submarine a pair of guide towers are placed just forward and aft of the submarine in a predetermined and surveyed location. These guide towers consist of a large "Y" shaped round pipe to receive the cradle. The base of each guide tower is essentially a 6 x 6 foot box with two foot high sides that is filled with ballast to provide stability and weight for the guide towers. The towers are adjustable from side to side and up and down to precisely align the lifting cradle.

The lifting cradle is the centerpiece of the recovery and is designed to push large steel reinforced plates at a 45-degree angle underneath the submarine and capture the sediment that surrounds and uniformly supports the submarine. The plates are actuated with the use of hydraulic rams and proprietary measures will be used as necessary to assist in closing the plates. These measures do not include intrusive or potential damaging methods but overcome some of the basic problems of skin friction, soil resistance and other forces. The procedure for activating the plates begins with two plates being pushed simultaneously near the middle of

the cradle to lock the cradle firmly into the seabed. The procedure is then repeated forward and aft of the central plates and then the other plates follow after the critical alignment and attitude has been locked in. After all of plates have been closed and verified, the partitioned ballast tanks are inflated to achieve positive buoyancy. A differential buoyancy is used to "peel" the cradle out of the sediment and, once again, proprietary measures are used to insure a smooth controlled exit from the seabed.

It has been a principle belief from the inception of our lifting concept that the key to success for both small lifts, below 100 tons, and larger lifts, approaching and exceeding a thousand tons, lies in the simplification of engineering and reducing risk by not raising the lift above the water. The principal area of failure in ship recovery is, principally, at the air-water interface. This is where the buoyant force is removed and the weight increases dramatically. This change may also cause a change in friction and this is where loads, cables and straps shift and the disasters often occur. To avoid this nightmare scenario, our lifting cradle is floated over to a lifting tray only a few feet away and the contents of the cradle are carefully deposited in the tray that has the matching geometry as the cradle.

When the cradle with the submarine is floating directly above where the submarine lies, it is attached on a short tether of approximately six feet and anchored to each guide tower. In addition to these two tethers which allows the cradle and submarine to float clear of the seabed, two other cables have been attached from the mid-point of each end of the cradle to the mid-point of each end of the nearby lifting tray. A simple procedure allows the cradle to rise slightly and float directly over the lifting tray with taut cables. Still with its positive buoyancy the cradle and submarine are winched down into the tray and shackled firmly to the tray.

Still with positive buoyancy, the plates are retracted in reverse order. When all the plates are retracted and the submarine and its surrounding sediment are deposited in the tray, the safety shackles are removed and the winch is paid out as the empty cradle rises to the surface. The cradle is either towed or lifted out of the way and placed on deck in the previously removed guide towers.

The recovery of the structurally sound, water tight, lifting tray is a relatively easy procedure. The lifting tray with the submarine and its surrounding sediment is raised to the surface and placed on deck for all to see and ready to be delivered by any number of means to the waiting conservation facility.

As the reader can see it is very difficult to explain the fine details of the mechanism and the procedure when it is necessary in pre-contract proposals to protect proprietary methods. Currently we have fourteen patents in process related to the lifting cradle and these developments have solved many of the intricate details required in a successful lift.

Lifting Procedure

- Arrival on site, mooring or anchoring of support vessel(s) on site
- Verification of site condition as per agreement
- Placement of guide towers at either end of the Hunley, towers ballasted
- Placement of PVC guide to verify measurements, clearance and position, removal of PVC guide
- Crane places lifting cradle in the open position in the water with positive buoyancy
- Cable lift cradle to guide towers and winch lifting cradle down and into guide towers (graduated spar buoys will assure the lifting cradle is lowered evenly)
- Double check position, achieve negative buoyancy for lifting cradle
- Place lifting tray in position next to the submarine
- Cable lifting cradle to each guide tower with six feet of cable (enough to clear the sea floor)
- Cable lifting cradle from the centerpoint at each end to the center point of lifting tray at each end
- Activate central plates of lifting cradle to anchor cradle around submarine, verify position and angles
- Activate plates at bow and stern, verify position and angle.
- Activate matched sets of plates and complete enclosure of the submarine
- Add lift to achieve positive buoyancy (balance of lift asymmetrical to assist in breaking suction)
- Activate measures to assist in breaking the bottom suction

Lifting device with submarine enclosed suspended above the bottom and anchored to the guide towers and to the neighboring lifting tray.
Remove tension from cables from guide towers to lifting device and unshackle
Back off on winch to allow lifting cradle and submarine with positive buoyancy to float directly over the lifting tray
Winch down into the matching lifting tray
Check position and alignment, maintain positive buoyancy, remove alignment cables
Attach snug cable between cradle and tray
Recover guide towers and place on deck in position to receive empty lifting cradle
Retract plates of lifting device in reverse order
When all plates are retracted, remove snug cable and pay out winch and allow positive buoyancy cradle to ascend to the surface.
Remove lift device from water with the crane and place in guide towers for transport.
Raise lifting tray with crane to balance boom for horizontal lift, lift and place on deck
Transport to dock and into conservation facility.

Not only is the preceding proposed method for recovery structurally safer, there are a number of other advantages. It does not expose the submarine to wave surge, recovers possibly sensitive materials surrounding and directly under the hull, contains the water, artifacts, and sediment from possible leakage, maintains the buoyant force around the submarine and it provides a stable tray suitable for many types of transport, lifting and conservation. It should also be remembered that the presentation to the public is an integral part of any project and the responsibility of the archaeologist if it can be done safely. Our method can be done much more safely and the recovery without a cage and multiple straps will allow the public to see and recognize the Hunley as a submarine.

SCHEDULING

We are fully aware of the established time frame for the recovery of the Hunley in June/ July of 2000. And we are confident that we can complete our manufacturing and testing on schedule and will be ready to proceed with a lift of the Hunley on Memorial Day or at the pleasure of the Hunley Commission thereafter

FINANCIAL PROPOSAL

International Archaeological Lifts, L.L.C. and its collective group have the expertise, resources and determination to complete an archaeologically successful recovery as scheduled We are experienced and able to work with Navy assets and Command and can either progress independently or incorporate Navy participation. We would welcome the participation of Navy assets and believe that it would further reduce the operational cost and therefore the costs to the Hunley Commission.

Basic parameters will need to be discussed if a contract is offered, one item would be access to the Hunley Research Centers's new facility at the former Navy Base for the staging and assembly of our lifting cradle would be preferred. Another location would serve as well but it would provide better coordination and cost savings to the project.

It should also be noted that our offer to proceed with work or to accept a contract is contingent upon examination of contract liabilities and the advice of counsel.

We are available to work with the Hunley Commission in any way we can assist, including a close association with your selected Program Manager, as our primary goal and interest is contributing to the safe recovery of the Hunley

SUMMARY

The preceding proposal presents both concerns with the currently proposed method and offers solutions in a safer, alternative method to recover the Hunley. The advantages of our method are manifold and are outlined as follows:

- Based on sound structural engineering principals
- There is no contact with the submarine
- Utilizes existing uniform and stable support
- No artifacts will be lost under the hull from a possible breach in the hull.
- Rudder and propeller assembly are supported in their exact current position
- Lift to the surface is in a fully supported steel tray, ready for transport and conservation
- Does not use the submarine itself as structural member in the lift
- Addresses all of the concerns expressed at the Conservation Symposium
- Higher visual appeal as the submarine is not obscured with straps and a cage.
- Maintains buoyant force
- No drainage of fluid from the interior of submarine
- Procedure can be demonstrated under nearly identical conditions before lifting the Hunley
- Procedure can be stopped and reversed at any time

CONCLUSIONS

The recent investigation (November 1999) of the corrosion levels of the Hunley revealed critical information about the design, pattern and level of corrosion of the rivets. This new information may dictate a re-evaluation of your proposed method and procedures. This finding coupled with the analysis by Laurence and Associates and the peer review by William Ogletree, that project deformations of 1-3/8 inch in the body of the submarine, both agree that if the current plan is followed that Hunley will separate at the seams and collapse. Our team has examined numerous modifications of the currently proposed method and none appear viable. Any method that includes removal of the sediment from around the Hunley should not be an option.

We believe that our recovery plan addresses the concerns of the archaeologists and conservators and it is a better, safer, higher quality method to recover the Hunley.

I would like to conclude with the following quote from the "H.L. Hunley Site Assessment" compiled by the National Park Service-Submerged Cultural Resources Unit, Naval Historical Center, and South Carolina Institute for Archaeology, Chapter 10, Conclusions and Recommendations, p. 120:

"Intact recovery can be accomplished in several ways. A preferred method would be to encase the hull and surrounding sediments in a tube, or clamshell lift device designed to completely support and stabilize the entire hull length and stern features along with their surrounding sediments. "

We are offering the Hunley Commission the preferred and safer method. I hope that you will seriously and objectively consider our offer, as we would welcome the privilege to bring the Hunley home safely.

APPENDICES

APPENDIX A
Resumes'
Company Backgrounds

**International Archaeological Consultants
3778 Briggs Cove Road
Hayes, VA 23072**

**Robert M. Adams
Archaeologist**

EDUCATION

M.A., Texas A&M University 1985, Anthropology - Nautical Archaeology
B.A.S., University of Minnesota, Duluth 1978, Earth Sciences/General Sciences
Our World-Underwater Scholarship 1975, One year scholarship to study with numerous international marine science authorities

EXPERIENCE

Mr. Adams serves as president of International Archaeological Consultants and principal archaeologist with responsibilities encompassing the full spectrum of archaeological investigations on both land and underwater projects. For most of his 19 years as an archaeologist he has engaged in cultural resource management and has a command of the requirements for any such undertaking. He has participated on archaeological projects in numerous states and foreign countries and is recognized internationally for his work.

Mr. Adams has developed an extensive knowledge of prehistory and history in Eastern North America, Texas, and Gulf Coast areas as well as his extensive academic pursuits in nautical archaeology. The scope of his research and field experience spans from 3rd century B.C. shipwrecks in the Mediterranean to 20th century shipwrecks in the Gulf of Mexico. His experience in terrestrial archaeology include all phases of investigations of prehistoric and historic sites to the 20th century. Mr. Adams has a broad base of experience in nautical archaeology and is well versed with remote sensing electronics and their use in cultural surveys.

Mr. Adams has produced scientific papers on technological developments in ship construction and maneuvering, and is published both in the United States and abroad.

SELECTED PROJECT EXPERIENCE

Participated in the initial cultural resources assessment planning for Grand Turk Island with Ships of Discovery and the Turks and Caicos National Museum. The project included prehistoric sites on land and underwater and

historic sites and structures including salt pond windmills, lighthouse and archives planning.

Participated as a consultant to the Texas Historical Commission in the successful secondary testing of the shipwreck "Belle", lost in 1686 in Matagorda Bay, Texas by the French explorer LaSalle.

Directed three separate archaeological contracts at Potomac Yards, Alexandria, Virginia to locate a former canal and the Preston Plantation and associated graveyard. Conducted for R. F. & P. Corporation and Charles E. Smith Companies.

Participated in excavation of U.S.S. Eastport, Civil War ironclad and E.F. Dix, which sank in 1865 in Red River near Natchitoches, Louisiana. A Corps of Engineers project with Coastal Environments and Pan American Consultants.

Directed Phase II investigation at Stonegate - Parcel C, 27 acres, Alexandria, Virginia.

Field director for survey to locate four galleons lost in 1605 on Seranilla Bank, Columbia S.A. with the Pacific Geographic Society.

Author of prehistoric context for Northeastern North Dakota, Stanley R. Mikelson Safeguard Complex. In conjunction with Pan American Associates and Teledyne Brown.

Phase I survey of 1.3 acres proposed "Planet Place", Alexandria, Virginia.

Directed Phase III mitigation of late 18th-mid 19th century house site (44AX162). For Mark Winkler Company, Alexandria, Virginia.

Directed Phase II evaluation of the Terrace 2B site (44AX163) a prehistoric site and the Terrace 1 Site (44AX162), an historic site, for the Mark Winkler Company, Alexandria, Virginia.

Co-Principal Investigator of the Phase II evaluation of the Crow Rock Bottom Site (36GR101) a prehistoric campsite in Greene County, Pennsylvania.

Co-Principal investigator of the Phase III mitigation of the Footbridge Rockshelter (36GR196) Greene County, Pennsylvania.

Directed Phase I survey of the Upper and Lower Ponds at the Winkler Botanical Preserve, Alexandria, Virginia.

**International Archaeological Consultants
3778 Briggs Cove Road
Hayes, VA 23072**

Robert M. Adams
Archaeologist

EDUCATION

M.A., Texas A&M University 1985, Anthropology - Nautical Archaeology
B.A.S., University of Minnesota, Duluth 1978, Earth Sciences/General
Sciences

Our World-Underwater Scholarship 1975, One year scholarship to study
with numerous international marine science authorities

EXPERIENCE

Mr. Adams serves as president of International Archaeological Consultants and principal archaeologist with responsibilities encompassing the full spectrum of archaeological investigations on both land and underwater projects. For most of his 19 years as an archaeologist he has engaged in cultural resource management and has a command of the requirements for any such undertaking. He has participated on archaeological projects in numerous states and foreign countries and is recognized internationally for his work.

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Mr. Adams has produced scientific papers on technological developments in ship construction and maneuvering, and is published both in the United States and abroad.

Participated as a consultant on the recording of the shipwreck Indiana, sunk in Lake Superior in 1859 with Texas A & M University and the Smithsonian Institution.

Performed archaeological monitoring of excavations to bury utility lines across historic market square in Fredricksburg, Virginia, established c.a. 1733. (Harrison & Associates)

Performed archaeological investigation of the Central Rappahannock Regional Library, Fredricksburg, Virginia. Located in historic Fredricksburg, the property was first owned by Fielding Lewis in 1749.

Performed field testing and surveying with the Acoustic Subsurface Probe (ASP), a prototype imaging system developed by Applied Sonics Corporation. Work focused on imaging anomalies to assist in locating the Gallega, abandoned by Columbus in 1503 on his fourth voyage in Rio Belen, Panama.

Co-Directed the Phase I archaeological investigation of a 30 acre tract at Ferry Farm, the boyhood home of George Washington, in Stafford County, Virginia. The project was undertaken for Stafford County's Ferry Farm Project. One prehistoric site and a historic site were identified in this survey.

Co-Directed the archaeological examination of a utility corridor for Stafford County's Department of Utilities and the Ferry Farm Project along the east property line of Ferry Farm bordering State Highway 3's easement.

Field Director for the Phase I archaeological investigation at Haymount Farm, a 1,605 acre tract in Caroline County, Virginia. Seven prehistoric sites, sixteen historic sites, and five multi-component sites for a total of 28 sites have been identified to date.

Assisted the field supervision on a reconnaissance level archaeological survey on the Milbank estate in King George County, Virginia for the Society of the this investigation was to locate and preserve the remains of Wiliam Strother's first residence in the New World, dated 1669, and to facilitate this resource's nomination to the National Register of Historic Places.

Tested prehistoric and historic multi-component site near West Point, Virginia. Conducted Phase I survey for proposed SE Expressway in Chesapeake, Virginia. (College of William and Mary Archaeological Project Center)

Phase III archaeological mitigation of prehistoric site near Reading, Pennsylvania. Phase II archaeological investigations at the Simpsonville Stone Ruins, and the Heritage Heights site, Howard County, Maryland. (GAI Consultants, Inc.)

Assisted the field supervision on a reconnaissance level archaeological survey on the Milbank estate in King George County, Virginia for the Society of the Descendants of Emigrant William Strother of King George, Virginia. The purpose of this investigation was to locate and preserve the remains of William Strother's first residence in the New World, dated 1669, and to facilitate this resource's nomination to the National Register of Historic Places.

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Phase III archaeological mitigation of prehistoric site near Reading, Pennsylvania. Phase II archaeological investigations at the Simpsonville Stone Ruins, and the Heritage Heights site, Howard County, Maryland. (GAI Consultants, Inc.)

Performed Phase I survey of an 11 mile segment for the SE Expressway in the city of Virginia Beach and Chesapeake, Virginia. Phase I survey of proposed 10 mile water pipeline for the City of Norfolk, Virginia. (Mid-Atlantic Archaeological Research, Inc.)

Performed preliminary reconnaissance and subsequent survey for the Gallega, abandoned in 1503 by Columbus on his fourth voyage in Rio Belen, Panama. (Institute of Nautical Archaeology, Texas A & M University-Exploration & Discovery Team)

Conducted Phase II testing of five proposed bridge crossing sites in York and Gloucester Counties for the York River Bridge Crossing Project. (College of William and Mary Archaeological Project Center)

Surveyed and performed limited testing of sites on a 700 acre area near Williamsburg, Virginia for the Stonehouse Development Project. (Virginia Archaeological Services)

Performed Phase I survey of an 11 mile segment for the SE Expressway in the city of Virginia Beach and Chesapeake, Virginia. Phase I survey of proposed 10 mile water pipeline for the City of Norfolk, Virginia. (Mid-Atlantic Archaeological Research, Inc.)

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Mitigated the C.B. Comstock, a hopper dredge, which burned and sank in 1913 at Surfside, Texas. (Coastal Environments, Inc.)

Performed archaeological excavation of the "Molasses Reef Wreck," an early 16th century wreck in Turks and Caicos Islands, British West Indies. (Institute of Nautical Archaeology, Texas A & M University-Exploration & Discovery Team)

Excavated Virginia Manufactory of Arms site in Richmond, Virginia. This site was constructed between 1799-1802 and was responsible for the manufacture of small arms. The site was later used as a rolling mill, and destroyed in 1865 in the burning of Richmond. (Association for the Preservation of Virginia Antiquities)

Assisted the Yorktown Shipwreck Archaeological Project in excavation of an 18th century British merchant vessel (44YO88) associated with the conclusive battle of the American Revolutionary War where British forces surrendered to allied French and American forces on October 19, 1781. (Virginia Division of Historic Landmarks)

Employed in archaeological survey, testing and excavation of numerous prehistoric and historic sites in central and east Texas, and Louisiana over a two year period. (Espey, Huston, & Associates)

175 Water Street Project. Excavated a well preserved early 18th century merchant vessel used as cribbing to expand land use into the East River. The ship was located in Manhattan, two blocks inland from the East River. (Soil Systems, Inc.)

Mitigated the C.B. Comstock, a hopper dredge, which burned and sank in 1913 at Surfside, Texas. (Coastal Environments, Inc.)

Performed archaeological excavation of the "Molasses Reef Wreck," an early 16th century wreck in Turks and Caicos Islands, British West Indies. (Institute of Nautical Archaeology, Texas A & M University-Exploration & Discovery Team)

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Assisted the Yorktown Shipwreck Archaeological Project in excavation of an 18th century British merchant vessel (44Y088) associated with the conclusive battle of the American Revolutionary War where British forces surrendered to allied French and American forces on October 19, 1781. (Virginia Division of Historic Landmarks)

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Pedro Bank Survey, Jamaica, British West Indies: survey for shipwrecks on the Pedro Bank at the request of the government with the primary concentration on the location of Spanish treasure galleon, Nuestra de los Carmen or "Genosse" sunk in 1733. (Institute of Nautical Archaeology, Texas A & M University)

Caymen Island Project, Caymen Islands, British West Indies: survey for shipwrecks in these islands at the request of the government during which 52 marine and three land sites were studied. Sites dated from the late 17th century. (Institute of Nautical Archaeology, Texas A & M University)

Pedro Bank Survey, Jamaica, British West Indies: survey for shipwrecks on the Pedro Bank at the request of the government with the primary concentration on the location of Spanish treasure galleon, Nuestra de los Carmen or "Genoesse" sunk in 1733. (Institute of Nautical Archaeology, Texas A & M University)

Cayman Island Project, Caymen Islands, British West Indies: survey for shipwrecks in these islands at the request of the government during which 52 marine and three land sites were studied. Sites dated from the late 17th century. (Institute of Nautical Archaeology, Texas A & M University)

Mombassa Wreck Excavation, Mombassa, Kenya: continuing excavation on the Santo Antonio de Tanna, a 42 gun Portuguese frigate sunk in 1697 off Fort Jesus. (Institute of Nautical Archaeology, Texas A & M University)

Serce Liman Survey Study, Bodrum, Turkey: study of materials excavated from an 11th century "Glass Wreck" of Serce Liman, Turkey. Funded by a National Geographic Society grant. (Institute of Nautical Archaeology, Texas A & M University)

Excavation in Serce Liman, Turkey: archaeological excavation and study of 11th century "Glass Wreck," (National Geographic, June 1978) 2nd century B.C. "Hellenistic Wreck," and 3rd century B.C. "Scatter Wreck." (Institute of Nautical Archaeology, Texas A & M University)

Survey of the Black Cloud, Liberty, Texas: survey of sidewheel steamboat sunk in 1873 in the Trinity River and preparation of the final survey publication. (Texas A & M University)

Official United States observer for the Thracia Pontica International Symposium in Sozopol, Bulgaria, 1979.

Mombassa Wreck Excavation, Mombassa, Kenya: continuing excavation on the Santo Antonio de Tanna, a 42 gun Portuguese frigate sunk in 1697 off Fort Jesus. (Institute of Nautical Archaeology, Texas A & M University)

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Official United States observer for the Thracia Pontica International Symposium in Sozopol, Bulgaria, 1979.



December 15, 1999

International Archaeological Consultants
304 North Pearl Street
Natchez, Mississippi 39120

Attention: Mr. Robert M. Adams, President

Reference: Hunley Proposal

Dear Bob:

This letter serves as an introduction of our company and services. THE CRANE COMPANY has been in business since 1978. We evolved out of Wilhoit Steel Erectors and Rigging Company, which, in the fifties and sixties was the largest rigging and millwright contractor in the Southeast. Doing business as Wilhoit, we erected the largest gantry crane in the world on three separate occasions: Newport News Shipyard, The crane at Westinghouse Tenneco in Jacksonville, Florida, and again at Newport News, Virginia. In addition, we dismantled Launch Pad 34 and revamped the launch pad for the Space Shuttle at Cape Kennedy. The principals at Wilhoit decided to move to Florida and work with the space program. We however, wanted to stay in the Carolinas, thus the evolution of THE CRANE COMPANY. The majority of our personnel are ex-Wilhoit employees, and have been with us virtually since our inception. In addition to Ted and I, we have many Supervisors with experience in excess of 35 years, and they have imparted their knowledge and talents to the rest of our work force.

We are in the crane, rigging, millwright and erection service. We have extensive experience in equipment moving and setting, plant relocation, and overhead crane inspections and repairs. We have worked extensively with everyone from General Contractors to General Electric, Westinghouse, FN Manufacturing and Allied Chemical, and would be happy to give you a list of our References, i.e. names and phone numbers upon request.

Our company owns cranes (hydraulic and friction), tractors, lowboys, trailers, welding machines, air compressors, hoist dollies, jacks, 100 ton and 500 ton gantry systems and other equipment such as forklifts, from 5,000 to 75,000 pound capacities, and hydraulic platform trailers to perform whatever job, project or maintenance you may require.

Robert, as you can see from the enclosed photos, we have had extensive experience on both land and sea when it comes to rigging and the handling of massive structures such as the

launch pad for the space shuttle or the gantry cranes at Newport News and Westinghouse Offshore Power, to something as delicate as the Browns Ferry Boat. Please see the enclosed photographs.

We have been in touch with Mr. Bos Smith at Steven's Marine, who is inordinately familiar with the Charleston Harbor and surrounding marine area. Steven's will provide the barges and marine equipment, THE CRANE COMPANY will provide the cranes, rigging and riggers to raise The Hunley, and get her safely onshore and transported to the destination of choice.

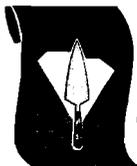
We are looking forward to meeting with you on Monday, and assisting you with this project.

Sincerely,
THE CRANE COMPANY

A handwritten signature in black ink, appearing to read "Mike Garvey", written over the printed name.

Mike Garvey
Vice President

MJG/km



THE UNIVERSITY OF SOUTH CAROLINA

→ Mr Price
The Crane Co.

SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

Ted, That you'd like this for your files. What an odyssey for the old boat! Thanks for 25 August 1992 everything!
- Bruce

Concerning the Browns Ferry Vessel

Dear Friends of the Browns Ferry Vessel:

This is an update to my recent 13 September 1991 and 17 February 1992 communications with you:

16 years after its removal from the bottom of the Black River (18 years since it was found and brought to our attention by Mr. Hampton Shuping) and its subsequent treatment, the "Browns Ferry Vessel" (really a coastal and riverine trading vessel) was taken on Monday 27 July 1992 from its large conservation facility here at USC (built with the help of various entities, notably the University of South Carolina and the South Carolina Department of Archives and History) and on the 28th trucked back to Georgetown by the original movers *The Crane Company*, and installed on the third floor of the Kaminski Building as the long planned nucleus of a maritime display by the Rice Museum.

This was done by many people, led here in Columbia most recently by our SCIAA Conservator Dr. Jonathan Leader and in Georgetown by the Georgetown County Historical Commission-appointed architect Steve Goggins, under the long term agreement that the vessel should return to Georgetown.

Many, many obstacles presented themselves from the earliest conservation experiments to the early June 1992 newspaper suggestion that Georgetown no longer wished to accept the Vessel. It is not my purpose to review the human spirit, but to gently and appreciatively recognize especially those who remembered and honored the agreement and those who raised and managed the necessary money and organizations.

The importance of the Browns Ferry Vessel is believed to be that of being among the oldest (if not the oldest) Colonial American constructed boats (probably made, we think, around the early part of the 1700's and probably sailed by African-descent crews), which was engaged in the plantation-support trade that made colonial South Carolina prosper during the time that it sank (we think only about a decade after it was built). It is also important for the history and techniques of its chemical treatment here in Columbia, and for the future tourism multiplier effect in Georgetown.

My letter is going to all of you as listed on the attached. Everyone of you has helped us at SCIAA many times and to very significant extents over the long stretch. Also, we will, many of us, continue to work together between SCIAA and the Rice Museum as we complete this special Vessel as a maritime display for the continued benefit of our Great State.

Sincerely,

Bruce Rippeteau
Director and
State Archaeologist



THE UNIVERSITY OF SOUTH CAROLINA

SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

THE BROWNS FERRY (August 92)
SCIAA/USC/STATE/GEORGETOWN CONTACT LIST

NAME	PHONE	FAX
SCIAA		
Dr. Jon Leader		
Mr. Christopher Amer		
Mr. Harold Fortune		
Mr. Steve Smith		
Dr. Fred Hocker		
Texas A&M University		
College Station, TX 77843-4352		
USC		
Ms. Debra Allen	777-8161	777-3697
Director, Media Relations		
J. Byrnes Int'l Center		
CAMPUS		
Mr. Ed Bass	777-3126	777-7334
Asst. Vice President		
Facilities Planning		
743 Greene St.		
CAMPUS		
Ms. Sharon Plyler Besley, Esq.	777-7854	777-9500
Staff Attorney		
System Legal Dept.		
Osborne 104		
CAMPUS		
Mr. James Cofer, Jr.	777-3127	777-7334
Purchasing & Central Supply		
Facilities Planning Center		
CAMPUS		
Dr. Pete Denton	777-7478	777-5619
Vice President for		
Business and Finance		
Osborne 201		
CAMPUS		

Mr. Cantey Heath Director, Constituency Relations Osborne 201 CAMPUS	777-9795	777-9480
Mr. Earle Holley Director Business and Finance Osborne 108 CAMPUS	777-7478	777-5610
Mr. Jerry Keeter Director, Instr. Services Law 006 CAMPUS	777-6430	777-6396
Ms. Shelley Kriegshaber Media Relations McKissick 3rd Floor CAMPUS	777-1234	777-3697
Mr. Shealy McCoy Director, Risk Management Business Affairs 200 Snowden CAMPUS	777-9596	777-8673
Ms. Lynne MaHaffey University Relations J. Byrnes Int'l Center CAMPUS	777-8161	777-3697
Ms. Chris Myers Director, Major Gifts Byrnes 6th Floor CAMPUS	777-7190	777-9708
Dr. Ed. Oswald Environmental Health Sciences HESC 310 CAMPUS	777-7210	777-4783
Mr. Terry Parham Chief Counsel System Legal Dept. Osborne 104 CAMPUS	777-7854	777-9500
Dr. George Reeves Interim Provost Osborne 108 CAMPUS	777-2930	777-9502

The Honorable Douglas L. Hinds 1-527-2441
South Carolina Senate
P.O. Drawer 1410
Georgetown, SC 29442

Mr. William Lawrence, Director 734-0166 734-1409
Executive Director
SC Parks Recreation and Tourism
1205 Pendleton Street
Columbia, SC 29201

Dr. Charles Lee 256-7231
1325 Adger Road
Columbia, SC 29205

Representative John Snow 558-2072
SC House of Representatives
Rt. 1, Box 192
Hemingway, SC 29554

Dr. George Vogt, Director 734-8577 734-8820
Archives and History
1430 Senate St.
Columbia, SC 29211

GEORGETOWN

Ms. Johnnie Cowan 237-2791
Georgetown County Historical Commission
4307 Parker Avenue
Pawleys Island, SC 29585

Ms. Pat Doyle 546-4512
528 Front St.
Georgetown, SC 29440

Mr. James Fitch 546-7423
Executive Director
The Rice Museum
Georgetown, SC 29440

Mr. Steve Goggins, Chair 237-4246
Georgetown County Historical Commission
The Rice Museum
Georgetown, SC 29440

Mr. Gordon Hartwig 1-546-4189
County Administrator
PO Drawer 1270
Georgetown, SC 29442

Mr. Bill Oberst
P.O. Box 181
Georgetown, SC 29442

527-4946

Ms. Rita Rodwell
212 Orange St.
Georgetown, SC 29440

1-546-5021

Mr. Mitch Sizemore
City Administrator
P.O. Drawer 939
Georgetown, SC 29442

546-2556

Ms. Michelle Slater, Chair
Georgetown County Historical Commission
The Rice Museum
Georgetown, SC 29440

237-4246

RELATED

Mr. Bill Floyd
1030 Beltline Blvd.
Columbia, SC 29205

787-5567

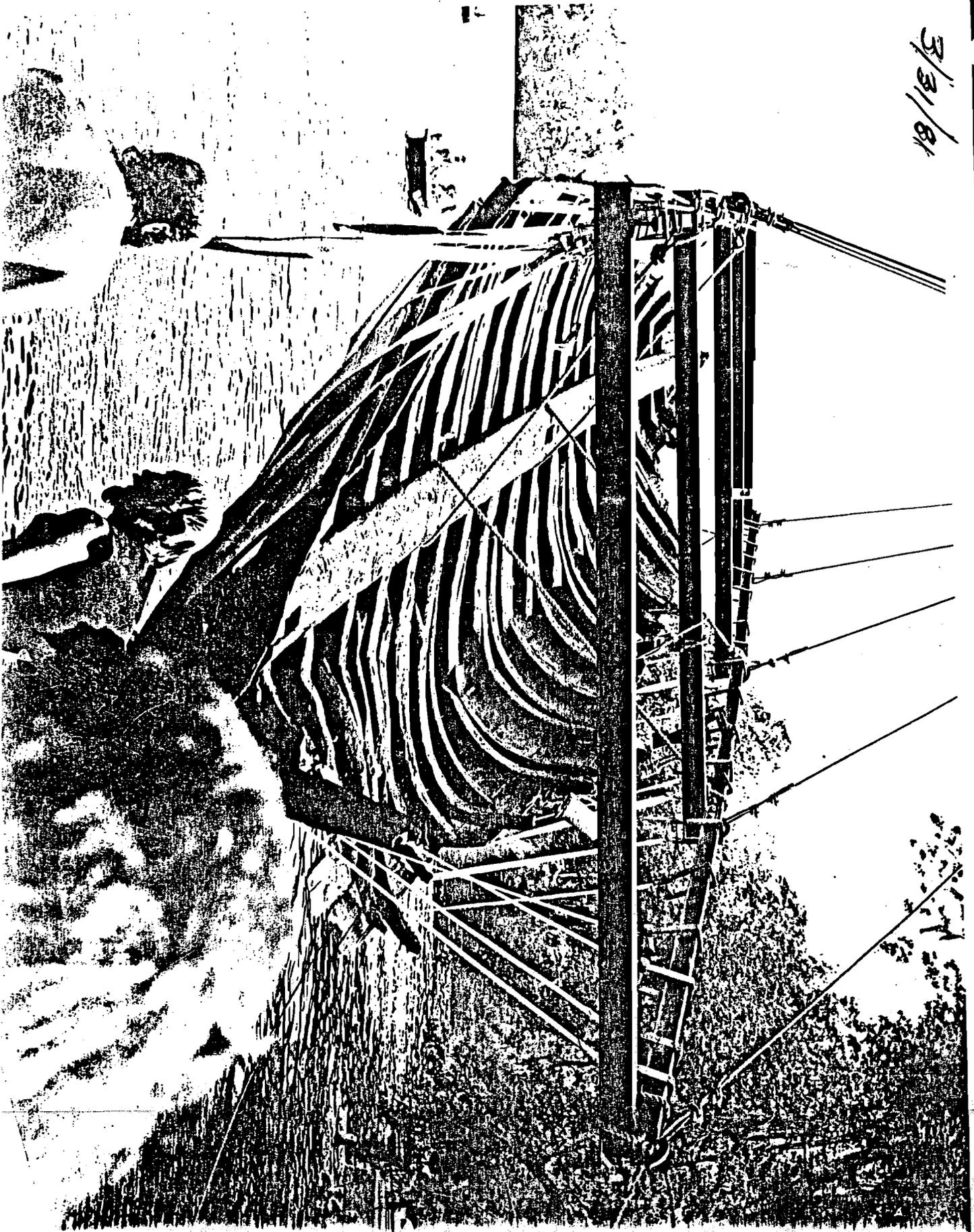
Mr. Hampton Shuping
P.O. Box 1236
Conway, SC 29526

1-248-1223

Mr. Ted Price
The Crane Company, Inc.
P.O. Box 12222
Columbia, SC 29211-2222

796-3072

3/31/81



STEVENS TOWING CO., INC.

MARINE TRANSPORTATION SINCE 1913

4170 HIGHWAY 165
YONGES ISLAND, SOUTH CAROLINA 29449

843-889-2254
FAX 843-889-6119

December 15, 1999

Mr. Robert Adams
International Archeological Consultants
7622 Lake Bolsea Dr.
Corpus Christi, TX 78413

Dear Mr. Adams:

I would like to introduce our company, Stevens Towing Co., Inc., a midsize barge transportation company based in Yonges Island, South Carolina, just south of Charleston. Stevens has been in this business since 1913, originally engaged in moving produce and passengers from the local barrier islands to the Charleston market. Our current business lies on the East Coast and Gulf inland waterways, coastwise U.S. and international ocean movements to the Caribbean and South America. Now we are hoping to expand our market share and explore new opportunities with a broader customer base.

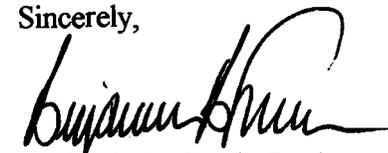
Stevens is expert in marine transportation in the areas of the Lower Atlantic Coast (Florida, Georgia, South Carolina, North Carolina, and Virginia). We have completed numerous movements in the Northeast U.S. and the Gulf States. We are working hard at meeting new customers and solving their transportation problems.

Stevens has completed many projects in foreign markets, primarily in the Caribbean Basin, with some movements to the West Coast. We have made some valuable contacts and plan to continue expanding our ocean transportation projects.

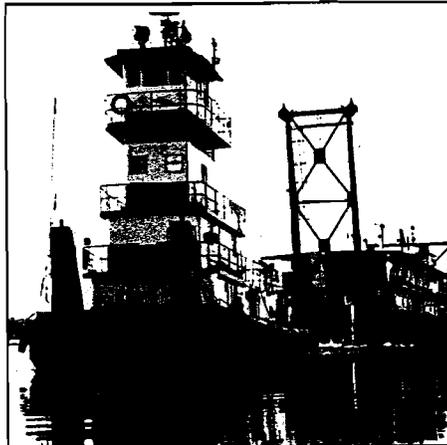
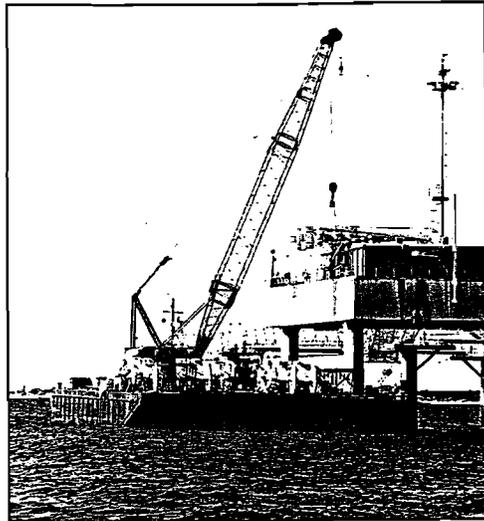
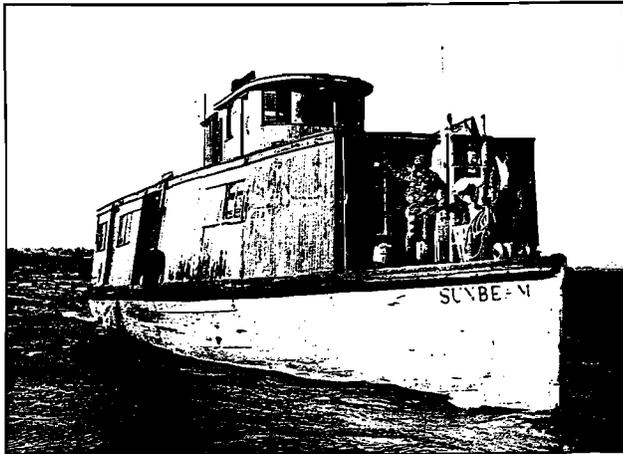
Our company works closely with several rigging companies to develop solutions for the difficult or heavy lift projects. Stevens has had success with roll on/ roll off operations with heavy lift trailers, float on/float off with vessels, and lift on/lift off with large cranes. We have been successful in all of these approaches and combinations of these approaches.

If we can assist you with any problems or movements you are facing please call me at (800) 868-6946 or FAX (843) 889-6119. Thank you for your time and consideration.

Sincerely,

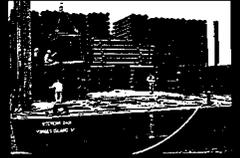


Benjamin B. Smith, Jr.
Operations Manager



- **Business Incorporated in 1913 operating for 81 years.**
- **Experienced ICC common carrier**
- **Inland, coastwise and ocean towing**
- **Barge fleet for heavy loads.**
- **Proven experienced operators.**
- **Complete marine repairs.**
- **International deliveries anywhere on the Caribbean sea including Central and South America.**

**CARGO TO
SOUTH
AMERICA**



- **9,173 cubic meters of water pipe.**
- **Heavy construction equipment.**
- **30 LNG tanks.**
- **Floating container pier for Gran Colombiana Lines.**
- **U.S. Navy landing craft.**
- **Prefab buildings.**

**PROJECT
CARGO**



- **Offshore loading arms to Bonaire/Bahamas.**
- **Ammunition to Puerto Rico.**
- **Heavy lift transport of transformers.**
- **Westinghouse water break to west coast.**
- **Helicopter west to east coast.**
- **NASA orbital access platform.**
- **Submarine tail sections.**
- **US NAVY/MTMC/MSC.**
- **Transporting rare and expensive museum aircraft.**

TELEPHONE 803-889-2254
FAX 803-889-6119

CALL 800-868-6946

APPENDIX B
Engineering Evaluation
William P. Ogletree, P.E.

William B. Ogletree, P. E.
11117 Stormy Ridge Road
Austin, Texas 78739

...nce, P.E.
...nd Associates
90...cabua St.
...si, TX 78404

... Review of Analysis of Loads (imposed by excavation of bottom material presently
... bombing hull of the CSS Hunley submarine).

... complimented by your request for Peer Review of your analysis by me. In my
review, I will endeavor to add any insight that my several years of having dealt with submerged
structures has helped me develop.

... have reviewed a small portion of the very general information that is available on the
construction materials and techniques, the service history, the sinking, the long interment and
recovery of the CSS Hunley. I am not familiar with the various interests or agencies active in
the efforts to raise this historic artifact. In all of the remarks I make in this review, I shall
try to stay against assumptions or presumptions beyond that information and the information
implied in the presence of your Analysis.

... first, let me state the criteria that I perceive as basic influences in your analysis.

1. The rivets in the seams connecting the longitudinal plates to the top and bottom half
cylinders of the hull are deteriorated.

... and further expect that: in addition to those two port and two starboard rivet seams, there
is at least one additional longitudinal rivet seam in each of the circumferential plates in
the hull. Those seams would have been made when the original boiler cylinder was made.
They would predate the longitudinal plate seams and would have been subjected to internal
"Bulging" pressures in service as a steam locomotive boiler.

2. The sketches in your analysis imply that the condition is proposed, or presumed, wherein
the material burying and surrounding the Hunley would be excavated to expose the hull
and leave it resting on a mound with a crest ridge two feet wide.

3. Shings of some nature are to be installed through the upper ridge of the mound of the bottom
material (under the hull of the Hundley).

4. The shings are, through attachment to additional structure, to be used to support and
manipulate the exposed hull of the Hunley during the recovery process.

... In review of your analytical calculations, I agree with your geometric apportionment of
load locations. The material weights of the hull and incrusting marine growth are much as would
be anticipated for a structure submerged and buried in the bottom for a hundred and thirty plus

Ph and FAX: (512) 282-6490

e-mail: BillPE@aol.com

yes. I believe that the submerged weight of the silt (or infiltrated material) inside the Hunley may only turn out to be slightly less than 80 pcf, for not significantly enough to influence the loads, forces, stresses and strains that would be imposed on the hull if the implied excavation were to be undertaken.

I allowed your application of the static loads and concur with your rationale for the distribution of the loads and stresses that elements would be subject to.

In summarizing my evaluation of your analysis, Jimmy, I concur with the results of your analysis. In the fickle world of underwater activity, I think that I can best express my own opinion of a process such as you have analyzed by advancing through it a step at a time.

I would have overburden bottom material to the top of the upper surface of the hull.

It is probably OK to this point if care is taken to avoid impact or physical disturbance of the structure aft of the forward entry hatch and the torpedo boom. From that point on, the required results must prompt the activity.

If Step 2 is to excavate around the hull to the half depth line of the hull, then;

The torpedo spar (what of it was not blown away when the Housatonic was sunk), both entry hatchways and the turret aft of the forward hatchway would, in all likelihood, be unstable due to rivet and /or plate deterioration around the rivets. The gravity loads and the internal bursting forces in your analysis are now building!

It has been my experience that, even when two ferrous metals are involved, in submerged service, bolts, rivets and even welds tend to develop cathodic cells between the parent metal and the fastener. Unless sound connectors and parent plates are confirmed by reliable nondestructive testing, no general excavation should be done below Step 1. above.

Step 3 If through any stroke of luck, corrosion products and marine encrustation held the pieces of the Hunley together to achieve Step 2. and if the excavation were continued, then;

Excavation of the bottom material down to the mound with the 2 feet wide crest would have developed the loads, forces and stresses you described in your analysis. Obviously then, some where between conditions at Step 1. and Step 3., the recovery of the Hunley would have degenerated to a task of trying to pick up pieces in a site of liquefied bottom material. Depending on the excavation method being used, that process might include recovery of any excavation divers trapped by collapsing wreckage.

Step 4 If through any stroke of luck, corrosion products and marine encrustation held the pieces of the Hunley together to achieve Step 3., and if the hull had not slid off the mound to the keel side of the hull, then;

Do not jet under the hull to install straps..... At this point, the hull, the bottom material and the prospect of sending divers to further disturb the bottom support would be dangerous to the point that it is not useful to pursue the scenario further.

BillPE
Phone/FAX: (512) 282-6490

e-mail: BillPE@aol.com

ny, from this point your analysis demonstrates that the strap loads in a hoisting
ould, if nothing to that point had, produce failure stresses in the hull plates
I am at a loss to see a purpose to belabor a review beyond this point. It is apparent
posal to excavate around a steel, rivet connected structure, submerged and buried and
unknown periods for 133 plus years, has chosen a sure route to salvaging pieces, not
n historic artifact and a Civil War tomb.

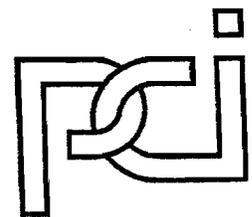
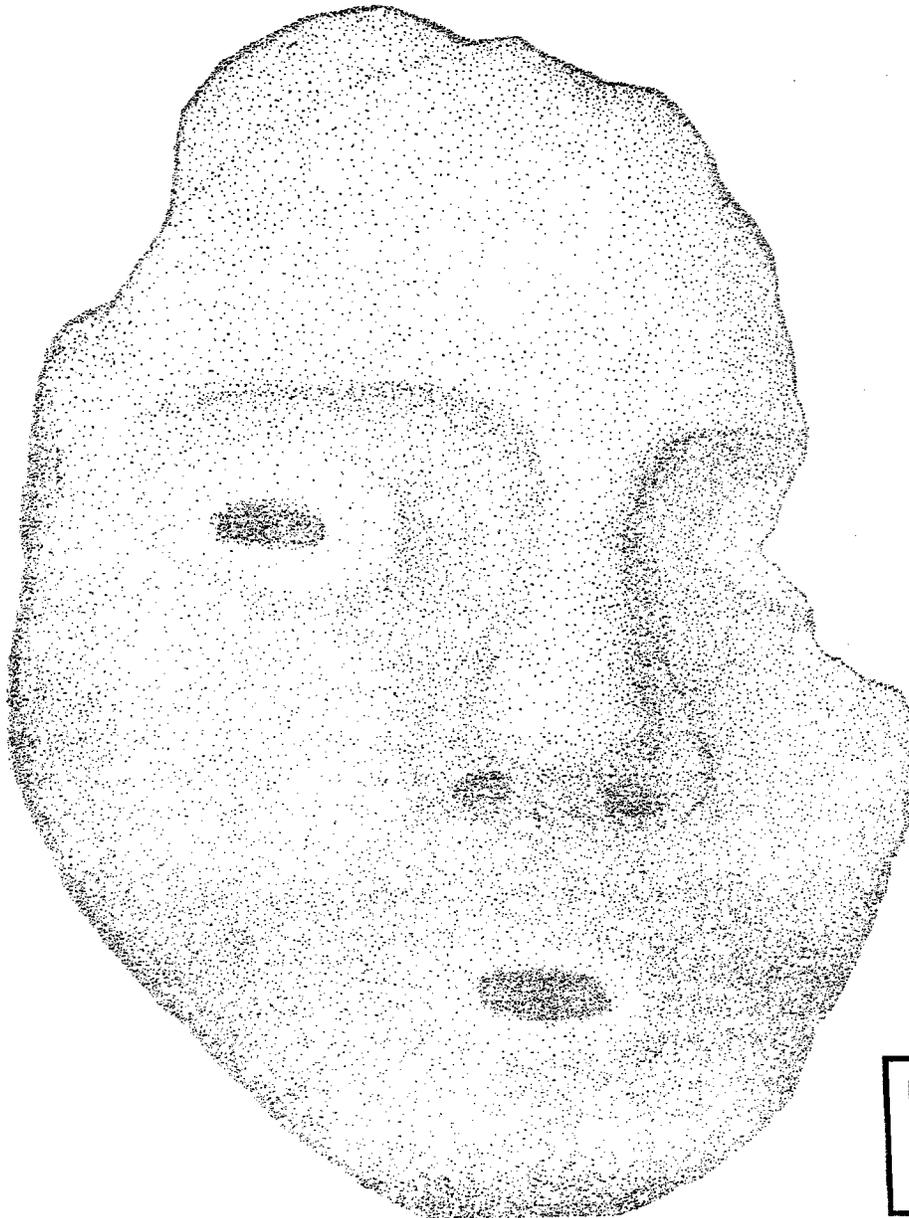
his opportunity to share my experience and to participate in your analysis of
ndavor. If there are any aspects of your analysis on which you would like more
ents please identify them and let me know.

Sincerely yours,

William B. Ogletree, P.E.
William B. Ogletree, P.E.

APPENDIX C
Pan American Maritime
Company Capabilities

PANAMERICAN CONSULTANTS, INC.
CULTURAL RESOURCES MANAGEMENT
CAPABILITY STATEMENT



ALABAMA
924 26th Avenue East
Tuscaloosa, Alabama 35404

TENNESSEE
15 South Idlewild
Memphis, Tennessee 38104

NEW YORK
36 Brunswick Road
Depew, New York 14043

FLORIDA
1207 North Himes, Ste. 5
Tampa, Florida 33607

Firm History

Laurence & Associates Consulting Engineers, Inc., was established in 1996 by Mr. Jimmy L. Laurence, P.E. as the result of the dissolution of McElhaney and Laurence Consulting Engineers upon Mr. Houston P. McElhaney's retirement. Mr. Laurence was Vice-President of McElhaney & Laurence and retained the firm's files and on-going projects of McElhaney & Laurence in addition to the files of the original firm established by Mr. McElhaney in 1951.

The firm specializes in the structural design of all types of commercial structures and has completed numerous projects here in South Texas. The firm has a consistent history of providing a cost efficient structural design that meets the requirements of the project. The following list are some of the more notable area projects which Laurence & Associates or Mr. Laurence performed the structural engineering.

International Bank of Commerce Facility
International Bank of Commerce - Laredo, Texas

Water Laboratory Building for the City for Corpus Christi
City of Corpus Christi - Corpus Christi, Texas

De Dietrich Manufacturing Facility
De Dietrich, U.S.A. - Corpus Christi, Texas

New Elevated Link
Driscoll Foundation Children's Hospital - Corpus Christi, Texas

New Press Building
Corpus Christi Caller Times - Corpus Christi, Texas

Texas State Aquarium - Phase 2A Expansion (Under Design)
Texas State Aquarium Association - Corpus Christi, Texas

Corpus Christi Natatorium/Gymnasium
Corpus Christi Independent School District - Corpus Christi, Texas

Gilbert J. Mircovich Elementary School
Ingleside Independent School District - Ingleside, Texas

Texas State Aquarium
Texas State Aquarium Association - Corpus Christi, Texas

Tuloso-Midway Rand Morgan High School
Tuloso-Midway Independent School District - Corpus Christi, Texas

Learning Resource Center
Del Mar College - Corpus Christi, Texas

Ella Barnes Elementary School
Corpus Christi Independent School District - Corpus Christi, Texas

Gymnasium Field House
Ingleside Independent School District - Ingleside, Texas

Dressing Rooms and Renovations to Buccaneer Stadium
Corpus Christi Independent School District - Corpus Christi, Texas

New High School and Library
Orange Grove Independent School District - Orange Grove, Texas

Jimmy L. Laurence, P.E.
President

I. Education

Mr Laurence graduated from Robstown High School in 1975. He attended Texas A & I University in Kingsville from September 1975 to December 1976 majoring in Civil Engineering. Mr. Laurence transferred to University of Texas - Austin in January 1977 and graduated in May of 1980 with a Bachelor of Science Degree in Civil Engineering, specializing in structures.

II. Employment History

January 1996 to present.

Principal, President and part owner of Laurence & Associates, Inc., Consulting Engineers, Corpus Christi, Texas. Responsible for the engineering design, inspection, and preparation of construction documents for commercial buildings and other structures. Mr. Laurence also performs forensic structural engineering investigations and serves as an expert witness in these investigations.

April 1987 to December 1995.

Principal, Vice President, and part owner in the firm of McElhanev and Laurence, Inc. Consulting Engineers, Corpus Christi, Texas. Mr. Laurence was responsible for the design, preparation of construction documents and observing the construction of commercial structures. He also performed forensic structural investigations and provided expert testimony regarding these investigations.

March 1985 to March 1987.

Chief Engineer and Engineering Department Manager for Wester Steel Company, Corpus Christi, Texas. Mr. Laurence supervised the engineering department which consisted of ten to twelve steel detailers and staff. He also coordinated the use of outside engineering firms engaged to prepare shop drawings for structural steel fabrication and erection. The duties of Mr. Laurence also involved assisting in the scheduling of fabrication and erection. When necessary, he was responsible for resolving issues regarding problems in erection or design with the contractor or design engineer.

September 1980 to February 1985.

Engineer in training for Houston P. McElhanev, Structural Engineer, Corpus Christi, Texas. Mr. Laurence designed and oversaw the preparation of contract documents for commercial buildings and other structures. His work was reviewed and sealed by Mr. Houston McElhanev, P.E.

May 1980 to August 1980.

Employed by Ogletree, Gunn, Byrne, Welsh, and Hubner, a local engineering firm, preparing researching various articles regarding concrete admixtures and doing preliminary structural design work.

- September 1979 to May 1980. Employed by the University of Texas as a research assistant at the Phil Ferguson Structures Research Laboratory in Austin, Texas. Mr. Laurence was responsible for assisting in the construction and testing of structural elements in steel and concrete. His duties were varied and included form construction, crane operation, welding test data recording, and test apparatus construction.
- June 1979 to August 1979. Employed by Ogletree, Gunn, Byrne, Welsh, and Hubner, assisting in the testing of a new concrete admixture for approval by the Texas Highway Department in precast concrete products. Also acted as a diving tender and diver.
- September 1978 to May 1979. Same as September 1979 to May 1980.
- June 1978 to August 1978. Employed by Ogletree, Gunn, Byrne, Welsh, and Hubner preparing concrete batch designs, overseeing the mixing and placement of concrete, and underwater construction of the piling beneath the concrete fire wall at the bulk cargo docks for the Port of Corpus Christi.
- January 1977 to May 1978. Same as September 1979 to May 1980.
- June 1976 to August 1976. Employed by the Precast Concrete Division of Heldenfels Brothers Construction Company placing and finishing concrete, tying reinforcement, and operating heavy equipment.

III. Licenses.

Licensed Professional Engineer in the state of Texas since January of 1985.

IV. Community Affiliations.

Member of the Diocese of Corpus Christi Building Review Committee.
Member of the Corpus Christi Cathedral Long Range Planning Committee.
Past member of the Corpus Christi Junior League Advisory Board.
Past President of the Montclair Elementary Parent Teacher Association.

V. Notable Project History.

International Bank of Commerce Facility
International Bank of Commerce - Laredo, TX

Water Laboratory Building for the City of Corpus Christi
City of Corpus Christi - Corpus Christi, TX

De Dietrich Manufacturing Facility
De Dietrich, U.S.A. - Corpus Christi, TX

New Elevated Link
Driscoll Foundation Children's Hospital - Corpus Christi

New Press Building
Corpus Christi Caller Times - Corpus Christi, TX

Laurence & Associates, Inc.

Texas State Aquarium - Phase 2A Expansion (Under Design)
Texas State Aquarium Association - Corpus Christi, TX

Corpus Christi Natatorium/Gymnasium
Corpus Christi Independent School District - Corpus Christi, TX
53,000 S.F.
\$4,900,000.00
Structural Engineer

Gilbert J. Mircovich Elementary School
Ingleside Independent School District - Ingleside, TX
60,000 S.F.
\$5,300,000.00
Structural Engineer

Texas State Aquarium
Texas State Aquarium Association - Corpus Christi, TX

Tuloso-Midway Rand Morgan High School
Tuloso-Midway Independent School District - Corpus Christi, TX
60 Acres Site / 280,000 S.F. Building
\$14,000,000.00
Structural Engineer

Learning Resource Center
Del Mar College - Corpus Christi, TX
17,000 S.F.
\$1,018,059.00
Structural Engineer

Ella Barnes Elementary School
Corpus Christi Independent School District - Corpus Christi, TX
Structural Engineer

Gymnasium Field House
Ingleside Independent School District - Ingleside, TX

Dressing Rooms and Renovations to Buccaneer Stadium
Corpus Christi Independent School District - Corpus Christi, TX
Structural Engineer

New High School and Library
Orange Grove Independent School District - Orange Grove, TX
105,000 S.F.
\$8,300,000.00
Structural Engineer

RESUME'

William B. Ogletree, P.E.
1999

EDUCATION:

- June 1946 Graduated High School at Sherman, Texas
- 1946 - 1948 Associate of Science at North Texas Agricultural College
(now U of T Arlington), Arlington, Texas
- 1948 - 1950 US Navy and US Air Force Pilot Training Programs
- 1951 - 1952 Undergraduate Math and Physics , North Texas State
University, Denton, Texas
- 1952 - 1954 Architectural Engineering, University of Texas at Austin
B S Arch. E , June 1954.
- 1958 - 1959 Graduate Student, Department of Engineering Mechanics and
Research Engineer III, Balcones Research Center, UT Austin.

PROFESSIONAL EXPERIENCE:

- 1954 - 1957 Structural Engineer with Walter P. Moore, P.E.,
Houston, Texas
- 1958 Structural Engineering Group Leader - Continental EMSCO,
Drilling Mast Division, Houston, Texas
- 1958 - 1959 Research Engineer III, Balcones Research Center, UT Austin
- 1959 - Present Consulting Engineering in structural, civil and forensic engineering
with offices in Corpus Christi, TX, New Orleans, LA and, currently, Austin, TX.

ACTIVE REGISTRATION: Year First Licensed, State, No., Specialization

- 1959, Texas, P.E. , 17255, Structural and Civil
1971, Louisiana, P.E., 12963, Civil, by Examination
1974, Arkansas, P.E., 3659, Civil, by Reciprocity
1979, Texas, R.P.L.S. (Inactive)

EXPERIENCE AND QUALIFICATIONS:

From 1954, while employed by Walter P. Moore, P.E. my responsibilities grew from entry level structural design to project engineer responsibilities in structural design and production of Construction Documents.

During 1957, while employed at Continental EMSCO, I was the leader of a four man team of engineers and technicians responsible for design, preparation of fabrication drawings, monitoring fabrication in the plant and installation and testing of a self erecting, barge mounted drilling mast.

In January of 1958, upon returning to the University of Texas to take advanced work in hydraulics and mechanics of materials, I was employed as a research engineer at the Engineering Mechanics Lab at Balcones Research Center. Conclusion of the technical research required preparation of several reports on the work. I was co-author of three of those reports.

In July 1959, I started a consulting engineering firm which began as William B. Ogletree, P.E. For the next thirty two years, I served in all engineering capacities from Project Engineer to Principal Engineer and President of Ogletree Engineering, Inc. In 1991, I sold the business to Russell - Veteto Engineering, Inc. and returned to consulting work as William B. Ogletree, P.E.

Engineering Practice specialty areas include building structures (of timber, concrete - both conventional and pre-cast and steel), bridges for various services ranging from pedestrian access bridges - to street and highway bridges - to bridges for mobilizing oil well drilling equipment in remote sites, ports and harbors structural and underwater engineering, naval architectural design of special service barges, conventional civil engineering projects involving land subdivision and municipal infrastructure and forensic engineering

Projects completed by me, or under my direct supervision, include design, preparation of contract documents, development of probable costs of construction, surveillance during construction of terrestrial, marine and submarine projects and forensic examinations, reports and testimony in court or by deposition. In timber, designs were prepared that ranged from individual trusses for manufacturing firms to large pole and timber structures. In steel the projects have varied in size and complexity from simple small commercial and residential buildings to heavy industrial marine dry dock railroads and vessel cradles. In concrete, projects have also been diverse, including the design of individual pre-stressed members through the design of buildings, bridges, and the pre-stressing beds upon which pre-stressed members are cast and stressed. Civil engineering projects have included designing municipal, industrial and residential systems for handling water, waste water and storm water. Some examples of the types of projects mentioned are:

Texas Historical Commission:

1988-89 Inspection, evaluation and report on rehabilitation and future service potential of the Roma, TX, USA - Miguel Aleman, Tamup., Mexico International Suspension Bridge.

Coastal Iron Works Shipyard, Corpus Christi, TX

Design, plans, specs. and estimates for a 1200 ton marine railway (dry dock).

The project included design for underwater installation of prefabricated steel sections on timber piles. It also included construction diving during installation and grouting.

University of Texas at Austin, Marine Science Institute, Port Aransas Laboratory

Design, plans, specs. and construction surveillance for projects at the Port Aransas Lab, including, inter alia : an entry channel from the Corpus Christi Ship Channel and a boat basin to moor and service research vessels; seawater intakes, seawater receiving, clarifying and distribution system for the main wet labs and several auxiliary research tank sites on the campus; campus streets, parking lots and drainage; an expanded entry channel and rehabilitation of an expanded boat basin; several separate repair projects for vessel damage to a timber research pier at the edge of the Corpus Christi Ship Channel and in 1993 a new prestressed concrete research pier and access bridge.

Port of Corpus Christi Authority

Inspections, reports, rehabilitation design and installation of marine borer protection on timber piles supporting the Rail Road Trestle to Cargo Dock 9 and Cargo Docks 1 and 3 through 8. Structural design of expansion of Cargo Dock 14. Structural and foundation design for the expansion of the cargo shed at Cargo Dock 9. Underwater inspection and structural design of rehabilitation to restore foundation damage from over dredging in the Ship Berth along the face of Cargo Dock 9.

Board of Commissioners of the Port of New Orleans

Underwater inspection and report, design and specs. for corrosion protection and construction surveillance of installation on steel pipe piles at the Perry Street Wharf.

Port of Brownsville Authority

Inspections, structural analyses, and reports on wharves and docks in the port including, *inter alia* : Cargo Dock 1, (concrete wharf on concrete piles); Bulk Materials Dock, (concrete deck on steel piles and substructure), this inspection resulted in design and installation of corrosion control; Dry Dock Mooring Facilities, in 1995 as a consultant to Russell - Veteto Engineering, Inc., structural design of steel sheet pile

bulkheads with concrete caps and Dolphins of steel pipe piles with concrete caps and access bridges from the shore to the Dolphin Caps.

City of Corpus Christi, TX

Inspection of construction of 6 submarine utility pipelines crossing the Port of Corpus Christi entry channel at the Highway 181 Harbor Bridge. Inspection of underwater and emergent portions of 10,000 linear feet of Corpus Christi Seawall and storm drain system from two feet below the mudline to the top elevation of the reinforced concrete seawall slabs. The report was prepared for, and recommendations acted upon in the 1985 Capital Planning Program. Subsequent to Capital Improvement Bond Issue, design of rehabilitation of 1,100 feet of concrete and steel sheet pile bulkhead at the barge dock in the City Marina. Structural Engineer responsible for design of the foundation system for the 1994 construction of Airport Rescue and Firefighting Facility at Corpus Christi International Airport, including structural building slab and beams on concrete piers with underreamed footings.

U.S. Navy, NAS CORPUS CHRISTI, TX

Analysis of existing structures and design of recommended repairs for modification of Hanger Buildings 41, 42 and 51 for C and D Aircraft Maintenance. Surface and submerged inspection of storm damage and prior accumulated damage to two miles of Seawall and Seaplane Launch Ramps. Instrumentation and testing of altitude test chamber from sea level to 100,000 feet altitude.

U.S. Navy, Chesapeake Division

Engineering Contractor for three Indefinite Delivery contracts (1983-1989) for underwater inspection, condition assessment and repair recommendations for Naval Facilities at various locations. Project assignments varied on separate inspections from Project Engineer / Diver to Engineer / Report Editor. Project Engineer / Diver and Engineer Report Editor on subsequent Russell-Veteto Engineering, Inc. Indefinite Delivery contracts with the US Navy (1990- 1995).

Emerald Point Marina, Lake Travis, Texas

Structural Engineer and Naval Architect for a 112 feet by 92 feet Barge Foundation and Anchoring System for a 100 feet by 80 feet two story Recreational Restaurant on Lake Travis with operating systems as a Barge Foundation from lake elevations from +680 to +716 Ft. MSL and for terrestrial foundation at lake elevations below +680 Ft. MSL
1997-98

Publications and presentations (In addition to reports noted at Balcones Res. Ctr.)

"Helicopter Borne Purse Net For Sampling Of Shallow Marine Bays", Co-author, U of T Marine Science Institute Research Journal, Vol. 9, 1963.

"Corrosion Protection of Steel Pipe Piles", oral presentation, ASCE, Texas Section, Spring Session Technical Meeting March 1972.

"Underwater Inspection and Repair of Bridge Substructures", Co-author, Transportation Research Board Synthesis paper 88, Dec. 1981.

"Underwater Inspection and Maintenance Programs For Transportation Structures", participation in the TRB Sub-committee workshop, January 1989.

Teaching Experience

Teaching experience includes ten years as an active YMCA Certified SCUBA Instructor at the University of Corpus Christi and Del Mar College and five years as Assistant Professor at Del Mar College in the Engineering Technician programs.

Professional Organizations

National and Texas Society of Professional Engineers
American Society of Civil Engineers

STEPHEN R. JAMES, JR.

EDUCATION

Master of Arts, 1985

Texas A&M University
Institute of Nautical Archaeology
Anthropology/Archaeology

Bachelor of Arts, 1979

Memphis State University
Anthropology/Archaeology

HONORS

Outstanding Young Alumni 1993

Memphis State University

Award of Merit in Historic Preservation 1992

Texas Historical Commission

PROFESSIONAL ASSOCIATIONS

Register of Professional Archaeologists (ROPA)
Society for Historical Archaeology (SHA)
Society of American Anthropologists (SAA)
Southeastern Archaeological Conference (SEAC)

AREAS OF SPECIALIZATION

Underwater Archaeology
Archaeological Site Layout, Scale Mapping
Measured Sketching and Photography
Archival and Historical Research
Remote Sensing Survey

Black Water Diving
Small Boat Handling
Word Processing
Public Speaking

POSITIONS HELD

Principal

Managing Partner
Panamerican Maritime, LLC
1995-present

Secretary/Treasurer
Panamerican Consultants, Inc.
1990-present

Underwater Archaeological Consortium (UAC)
1987-1990

Staff Underwater/Terrestrial Archaeologist
Espey, Huston and Associates, Inc. (EH&A)
1982-1987

Advisory Council on Underwater Archaeology
1995

ARCHAEOLOGICAL RESEARCH CONDUCTED

1999

Projects Manager for Cultural Resources Investigations for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-98-R-0005.

Projects Manager for Cultural Resources Investigations for the Memphis District, U.S. Army Corps of Engineers, Contract No. DACW66-97-D-0006.

Projects Manager for Submerged Cultural Resources Investigations for the New York District, U.S. Army Corps of Engineers, Under Subcontract to both Vittor and Associates, Contract No. DACW51-97-D-0009, and Northern Ecological Associates Contract No. DACW51-97-D-0010.

Project Manager. Remote-Sensing Survey for the Proposed Widening of the Yazoo Diversion Canal (Mississippi River), Warren County, Mississippi. For U.S. Army Corps of Engineers, Vicksburg District.

Project Manager. Remote-Sensing Survey For Construction of the Proposed Carthage Revetment (Mississippi River) Adams County, Mississippi. For U.S. Army Corps of Engineers, Vicksburg District.

Diving Supervisor. Diver Investigations for the U.S.S. *Col. Kinsmen*, St. Mary's Parish, Morgan City, Louisiana. For U.S. Army Corps of Engineers, New Orleans District under sub-contract to Coastal Environments, Inc., Baton Rouge, La.

Project Manager. Underwater Inspection of Targets, Borrow Area 2, Atlantic Coast of Long Island, East Rockaway Inlet to Rockaway Inlet, Queens County, New York, Storm Damage Reduction Project. For U.S. Army Corps of Engineers, New York District.

Project Manager. Additional Remote Sensing and Assessment of Submerged Cultural Resources Associated with the Battle of Johnsonville, Tennessee River, Tennessee. For Tennessee Historical Commission.

Project Manager. National Register of Historic Places Eligibility Evaluations of 13 Potential Watercraft Targets Located Within Items 5-9 of the Upper Yazoo Projects, Quitman, Tallahatchie, and Leflore Counties, Mississippi. For U.S. Army Corps of Engineers, Vicksburg District.

Project Manager. Remote Sensing Survey, Potomac River at Shepherdstown, Washington County, West Virginia. For Michael J. Baker Jr., Inc., Charleston, West Virginia.

Project Manager. White River Navigation to Newport, Arkansas Cultural Resources Reconnaissance. For U.S. Army Corps of Engineers, Memphis District.

Project Manager. Riverine Component of Terrestrial and Submerged Cultural Resources Survey Along Approximately 6 Km of the Wolf River, Shelby County, Tennessee. For the U.S. Army Corps of Engineers, New York District. By Panamerican Consultants, Inc., Memphis, Tennessee.

Project Manager. Archaeological Oversight Diver Evaluation of 18 Unidentified Magnetic Anomalies and/or Side-Scan Sonar Targets. Surfside, Texas. For Exxon Pipeline Company, MPC International, Inc., and Minerals Management Service division of the U.S. Department of the Interior. By Panamerican Maritime L.L.C., Memphis Tennessee.

Project Manager. Intensive Underwater Archaeological Survey Preferred Alignment, US 17, New Bern Bypass (R-2301) Craven County, North Carolina. For the North Carolina Department of Transportation. By Panamerican Consultants, Inc., Memphis, Tennessee. Michael Krivor Director.

1998

Projects Manager for Cultural Resources Investigations for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-98-R-0005.

Projects Manager for Cultural Resources Investigations for the Memphis District, U.S. Army Corps of Engineers, Contract No. DACW66-97-D-0006.

Projects Manager for Submerged Cultural Resources Investigations for the New York District, U.S. Army Corps of Engineers, Under Subcontract to both Vittor and Associates, Contract No. DACW51-97-D-0009, and Northern Ecological Associates Contract No. DACW51-97-D-0010.

Principal Investigator: Phase I Remote Sensing Survey And Preliminary Diver Assessment of Submerged Cultural Resources Associated With the Battle of Johnsonville, Tennessee River, Tennessee.

Project Manager. Remote Sensing Survey Near Shore Project Area Atlantic Coast of Long Island, Fire Island Inlet to Moriches Inlet, Fire Island, Suffolk County, New York, Interim Project. For the U.S. Army Corps of Engineers, New York District. By Panamerican Consultants, Inc., Memphis, Tennessee.

Principal Investigator: National Register Eligibility Evaluations of Targets 3B-2-2 and 3B-2-6 Located Within Item 3B-2 of the Upper Yazoo Project, Yazoo River, Leflore County, Mississippi. Conducted for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-98-R-0005.

Principal Investigator: Limited Survey and National Register of Historic Places Eligibility Evaluations of All Bridges, Structures, and Targets 4-6, 4-7, 4-11, 4-12, 4-15, and 4-16 Located Within Item 4 of the Upper Yazoo Project, Yazoo River, Leflore County, Mississippi. Conducted for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-98-R-0005.

Project Manager: Remote Sensing Survey and Probing of Submerged Targets on Thirteen Oxbows, Red River Waterway, Louisiana. Conducted for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-96-R-0007.

Project Manager: National Register Eligibility Testing of a Suspected Watercraft at Darrow Oxbow (River Mile 104.1), Pool 2, Red River Waterway, Louisiana. Conducted for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-98-R-0005.

Principal Investigator: Compilation of Four Shipwreck Recordations and Development of a Public Outreach Program for the Atlantic Coast of New Jersey Cultural Resource Monitoring Program. Conducted for the U.S. Army Corps of Engineers, New York District Under Subcontract to both Vittor and Associates, Contract No. DACW51-97-D-0009.

Project Manager: Underwater Archaeological Survey For the Proposed Utility Line Between Long Island and Spectacle Island, Boston Harbor, Massachusetts For the Central Artery/Tunnel Project. Conducted for the University of Massachusetts at Boston.

Principal Investigator: Phase 1A/1B Cultural Resources Survey, Yacht Haven Mixed-Use Development, St. Thomas, U.S. Virgin Islands. Conducted for Dames & Moore, Boca Raton, Florida.

Project Manager: Underwater Archaeological Site Identification At Masonboro Inlet, Wrightsville Beach, New Hanover County, North Carolina. Conducted for the Wilmington District, U.S. Army Corps of Engineers, Contract No. DACW54-98-P-3345.

Project Manager: Phase I Underwater Archaeological Survey, Sacramento River, Sacramento, California. Conducted for EIP Associates, Sacramento, California.

1997

Projects Manager for Submerged Cultural Resources Investigations for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-96-R-0007.

Projects Manager for Cultural Resources Investigations for the Memphis District, U.S. Army Corps of Engineers, Contract No. DACW66-97-D-0006.

Projects Manager for Submerged Cultural Resources Investigations for the New York District, U.S. Army Corps of Engineers, Under Subcontract to both Vittor and Associates, Contract No. DACW51-97-D-0009, and Northern Ecological Associates Contract No. DACW51-97-D-0010.

Projects Manager for Submerged Cultural Resources Investigations for the Savannah District, U.S. Army Corps of Engineers, Contract No. DACW21-94-D-0026.

Principal Investigator: Remote Sensing Investigation and Diver Evaluation of a Potential Civil War-Era Train Wreck, Watauga River, Carter County, Tennessee. Conducted for the Tennessee Division of Archaeology, Nashville, Tennessee.

Principal Investigator: Archaeological Assessment of a Submerged Watercraft, Tennessee River, Camden, Tennessee. Conducted for Raise The Gunboats, Inc., Camden, Tennessee.

Project Manager: Remote Sensing Survey and Diver Assessment of Bridge Bents, Michigan Street Bridge over the Sturgeon Bay Ship Canal, Door County, Wisconsin. Conducted for Teng & Associates, Inc., Chicago, Illinois.

Project Manager: Remote Sensing Survey and Diver Assessment of Targets, New Bridge over Croatan Sound, Dare County, North Carolina. Conducted for the North Carolina Department of Transportation.

Project Manager: Remote Sensing Survey and Probing of Submerged Targets on Thirteen Oxbows, Red River Waterway, Louisiana. Conducted for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-96-R-0007.

Project Manager: Remote Sensing Survey Brunswick Harbor Deepening Project, Glynn County, Georgia. Conducted for the Savannah District, U.S. Army Corps of Engineers, Contract No. DACW21-94-D-0004.

Project Manager: Remote Sensing Survey of the Tybee Beach Renourishment Project, Chatham County, Georgia. Conducted for the Savannah District, U.S. Army Corps of Engineers, under contract to Gulf South Research Corporation, Baton Rouge, Louisiana.

Project Manager: Cultural Resources Evaluation and Remote Sensing For the Archaeological Investigation of a Possible Watercraft (River Mile 149.2), Pool 3, Red River Waterway, Natchitoches Parish, Louisiana. Conducted for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-96-R-0007.

Principal Investigator: Terrestrial and Remote Sensing Investigations, Proposed Site of Harrah's Casino and Motel, Shreveport, Louisiana. Conducted for Harrah's Entertainment, Memphis, Tennessee in Conjunction with Precision Cartographics, Shreveport, Louisiana.

Project Manager: Diver Assessment at BRM-7501 Bridge Replacement on US-90 Tensaw-Spanish River, Mobile and Baldwin Counties, Alabama. Conducted for the Alabama Department of Transportation, Montgomery, Alabama.

Project Manager: Remote Sensing Survey, Near Shore Project Area, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, Long Island, New York. Conducted for the U.S. Army Corps of Engineers, New York District. DACW51-95-D-0024.

1996

Projects Manager for Submerged Cultural Resources Investigations for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-96-R-0007.

Projects Manager for Submerged Cultural Resources Investigations for the New York District, U.S. Army Corps of Engineers, Contract No. DACW51-95-D-0024.

Projects Manager for Submerged Cultural Resources Investigations for the Savannah District, U.S. Army Corps of Engineers, Contract No. DACW21-94-D-0026.

Principal Investigator: Underwater Archaeological Investigation and Documentation of Three Anomaly Clusters Within Three Segments of Proposed Preferred Corridor for Replacement of Bonner Bridge, Oregon Inlet, North Carolina. Performed for the North Carolina Department of Transportation under contract with Parsons, Page Brinkerhoff. Raleigh, North Carolina

Maritime Archaeologist: Diving Assessment for Target Anomaly No. 1, Port Ingleside, GIWW, Corpus Christi Bay, Nueces County, Texas. Under subcontract to Coastal Environments, Inc., for U.S. Army Corps of Engineers, Galveston District.

Project Manager: Magnetometer Survey for the suspected Civil War submarine Pioneer II site, Fort Morgan, Alabama. Conducted for the Mobile Archeological Society.

Project Manager: Cultural Resources Remote-Sensing Survey of the Navigation Channel Within Pools 3, 4, and 5 of the Red River Waterway, Louisiana. Conducted for the U.S. Army Corps of Engineers, Vicksburg District. DACW38-91-D-0017.

Project Manager: Remote Sensing Survey, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, Long Island, New York. Conducted for the U.S. Army Corps of Engineers, New York District. DACW51-95-D-0024.

Project Manager: Recordation of Two Shipwreck Sites in the Near-Shore Sand Placement Area, Asbury Park to Manasquan, Section II, Atlantic Coast of New Jersey Beach Erosion Control Project. Conducted for the U.S. Army Corps of Engineers, New York District. DACW51-95-D-0024.

Project Manager: Underwater Inspection of Four Shipwrecks, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Damage Reduction Project. Conducted for the U.S. Army Corps of Engineers, New York District. DACW51-95-D-0024.

Co-Principal Investigator: Cultural Assessment of Wrecks In The Potential Expansion Area For The Mud Dump Site In The New York Bight Apex. Prepared for Batelle Ocean Sciences, Duxbury, Massachusetts.

Principal Investigator: Identification and National Register of Historic Places Assessment of an Anomaly Cluster, Offshore Louisiana. Vermillion 25. Performed for Continental Engineering, Lafayette, Louisiana.

Co-Principal Investigator: Health and Safety Plan for the Bayonne Reach II Cultural Resources Mitigation. Subcontract to Fanning, Phillips and Molnar, Ronkonkoma, New York for the U.S. Army Corps of Engineers, New York District. DACW51-94-D-0034.

Project Manager: Remote Sensing and Diver Inspection Survey, St. Ignace and Mackinac Island Harbor Expansion Project, Mackinac County, Michigan. Performed for the Michigan Department of Natural Resources.

1995

Projects Manager for Submerged Cultural Resources Investigations for the Vicksburg District, Contract No. DACW38-91-D-0017.

Projects Manager for Submerged Cultural Resources Investigations for the New York District, Contract No. DACW51-95-D-0024.

Projects Manager for Submerged Cultural Resources Investigations for the Savannah District, Contract No. DACW21-94-D-0026.

Principal Investigator: Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, Richmond County, New York Reach; Arthur Kill, Union and Middlesex Counties, New Jersey Reach; and Kill Van Kull, Richmond County, New York Reach. Conducted for the U.S. Army Corps of Engineers, New York District. DACW51-95-D-0024.

Principal Investigator: Diver Investigation Relative to Submerged Cultural Resources, BRM-7501 Bridge Replacement on US-90, Apalachee and Blakely Rivers, Mobile and Baldwin Counties. Performed for the Alabama Department of Transportation.

Principal Investigator: Archaeological Data Recovery at the Fig Island Channel Site, Savannah Harbor, Georgia, A Technical Synthesis. Savannah District Corps of Engineers, Contract No. DACW21-93-D-0026, Delivery Order No. 0003.

Principal Investigator: Underwater Archaeological Survey and Determination of Eligibility of Eight Shipwreck Sites, in the Near Shore Sand Placement Area, Asbury Park to Manasquan, Section II, Atlantic Coast of New Jersey, Beach Erosion Control Project. U.S. Army Corps of Engineers, New York District. DACW51-94-0034.

Principal Investigator: Phase I Underwater Archaeological Survey, McKinley Marina Development, Milwaukee County, Wisconsin. Performed for the Milwaukee County Department of Public Works, Project No. 06-4654.

Archaeological Team Director: Identification and Analysis of the U.S.S. *Eastport* and *Edward F. Dix* In Pool 3, Red River Waterway, Grant Parish, Louisiana. Vicksburg District Corps of Engineers. Performed under contract to Coastal Environments, Baton Rouge, Louisiana.

Principal Investigator: Archival Research, Remote Sensing Investigation, and Diver Investigation, Riverwalk Project, Savannah, Georgia. Savannah District Corps of Engineers, Contract No. DACW21-93-D-0026, Delivery Order No. 0002.

Principal Investigator: Sidescan Sonar Survey and Diver Investigation Relative to Submerged Cultural Resources, BRM-7501 Bridge Replacement on US-90, Tensaw-Spanish River, Mobile and Baldwin Counties, Alabama. Performed for the Alabama Department of Transportation.

Archaeological Director: Phase 1A Cultural Resources Investigation, Raphune Hill Bypass, St. Thomas, U.S. Virgin Islands. Conducted for Parson, Brinkerhoff, Quade & Douglas, Inc., Tampa, Florida.

Principal Investigator: Phase 1A Terrestrial Cultural Resources Investigations on Parcels 2E51-19 and 2E53, Estate Caret Bay, St. Thomas, U.S. Virgin Islands. Conducted for W.F. McComb Engineering, P.C., St. Thomas, U.S. Virgin Islands.

Principal Investigator: Historical Assessment and Magnetometer Survey for Revetment Construction at Victoria Bend on the Mississippi River, Bolivar County, Mississippi. Vicksburg Corps of Engineers, Contract No. DACW38-91-D-0017, Delivery Order No. 24.

1994

Principal Investigator: Historical Assessment Relative to Submerged Cultural Resources, BRM-7501 Bridge Replacement on US-90, Tensaw-Spanish River, Mobile and Baldwin Counties, Alabama. Performed for the Alabama Department of Transportation.

Principal Investigator: Archival Quality Documentation to Historic American Building Standards (HABS/HEAR) of the Venus Point Lighthouse, Jasper County, South Carolina. Savannah District Corps of Engineers, Contract No. DACW21-93-D-0040, Delivery Order No. 0014.

Principal Investigator: Remote Sensing Survey, Savannah Harbor Operations and Maintenance Project, Chatham County, Georgia. Savannah District Corps of Engineers, Contract No. DACW21-93-D-0040, Delivery Order No. 0001.

Principal Investigator: Comprehensive Resource Inventory and Preservation Planning Study for World War II Cultural Resources at the United States Army Kwajalein Atoll. Performed for the United States Army Space and Strategic Defense Command under contract to Earth Tech, Huntsville, Alabama.

Principal Investigator: Further Investigation of Two Anomalies in the Fidler Bend-Cottonwood Area of the Mississippi River, Issaquena County, Mississippi. Vicksburg Corps of Engineers, Contract No. DACW38-91-D-0017, Delivery Order No. 21.

Principal Investigator: Historical Assessment and Magnetometer Survey of Revetment Construction at Three Locations Along the Mississippi River. Vicksburg District Corps of Engineers, Contract No. DACW38-91-D-0017, Delivery Order No. 17.

1993

Principal Investigator: The 15th Century Shipwrecks of La Isabela, Dominican Republic. A Remote Sensing Survey and Diver Investigation. Conducted with Indiana University under contract to the government of the Dominican Republic.

Project Manager: Phase II Archaeological Data Recovery, Area 4, Fig Island Channel Site, Savannah Harbor, Georgia. Savannah District Corps of Engineers, Contract No. DACW21-92-D-0013, Delivery Order No. 0045. Performed under contract to Gulf Engineers, Baton Rouge, Louisiana.

Project Manager: Archaeological Data Recovery, Area 2, Fig Island Channel Site, Savannah Harbor, Georgia. Savannah District Corps of Engineers, Contract No. DACW21-92-D-0013, Delivery Order No. 0045. Performed under contract to Gulf Engineers, Baton Rouge, Louisiana.

Project Manager: Archaeological Data Recovery, Area 5, Fig Island Channel Site, Savannah Harbor, Georgia. Savannah District Corps of Engineers, Contract No. DACW21-92-D-0013, Delivery Order No. 0045. Performed under contract to Gulf Engineers, Baton Rouge, Louisiana.

Principal Investigator: Underwater Archaeological Investigations, Washington Navy Yard, Anacostia Waterfront, Washington, D.C. Performed for the U.S. Navy Chesapeake Division Naval Facilities Engineering Command under contract to Ecology and Environment, Inc., of Lancaster, New York.

Co-Principal Investigator: Data Recovery "S.S. Mary" and Assessment of Anomalies Corpus Christi Entrance, Nueces County, Texas. Galveston District, Contract No. DACW64-01-D-009, Delivery Order No. 0014. Performed under contract with Coastal Environments, Inc., Baton Rouge Louisiana.

Principal Investigator: Documentation of the Civil War vessels C.S.S. Florida, U.S.S. Cumberland, Hampton Roads, Virginia. Performed for the Mobile District Corps of Engineers, Contract No. DACA01-92-D-007, Delivery Order No. 06, on behalf of the U.S. Navy, Atlantic Division Naval Facilities Engineering Command, Norfolk, Virginia.

Principal Investigator: Diver Hands on Evaluation of Anomalies Bight Channel Realignment, South Carolina. Savannah District Corps of Engineers, Contract No. DACW21-93-D-0013, Delivery Order No. 0031. Performed under contract to Gulf Engineering, Baton Rouge, Louisiana.

Co-Principal Investigator: Identification and Analysis of Historic Watercraft in the Shreveport, Louisiana to Daingerfield, Texas Navigation Project, Red River Waterway. Performed for the U.S. Army Corps of Engineers, Galveston District, under contract with Coastal Environments, Baton Rouge, Louisiana.

Principal Investigator; Underwater Archaeological Survey for Three Segments of the Proposed Preferred Corridor for Replacement of the Herbert C. Bonner Bridge, Oregon Inlet, North Carolina. Performed for the North Carolina Department of Transportation under contract with Parsons, Page Brinkerhoff. Raleigh, North Carolina

1992

Principal Investigator; Assessment of Seven Anomalies Located Offshore Bryan Mound Strategic Petroleum Reserve, Freeport, Texas. Performed for Fluor Daniels, Inc., Sugarland, Texas.

Principal Investigator; Marine Archeological Survey, Fredricksted Cruise Ship Pier, St. Croix, U.S. Virgin Islands Port Authority.

Co-Principal Investigator; Research Design for the Mitigation of the S.S. Mary, Port Arkansas, Texas. Performed for the U.S. Army Corps of Engineers, Galveston District, under contract with Coastal Environments, Baton Rouge Louisiana.

Principal Investigator; Remote Sensing Survey, Area South of Carolina Beach, Beach Nourishment Borrow Areas, Vicinity of Wilmington, North Carolina. Performed for the U.S. Army Corps of Engineers, Wilmington District, under contract with G.A.I. and Associates, Inc. Monroeville, Pennsylvania.

Co-Principal Investigator; Archaeological Assessment of the J.D. Hinde (41LB85), Channel to Liberty, Liberty County, Texas. Performed for the U.S. Army Corps of Engineers, Galveston District, under contract with Coastal Environments, Baton Rouge, Louisiana.

Principal Investigator; Assessment of Seven Anomalies Offshore Matagorda, Texas. Performed for K.C. Offshore, Inc., Baton Rouge, Louisiana.

Principal Investigator; Cultural Resources Investigations, Delta Mat Casting Field Additional Lands. Madison Parish, Louisiana. Performed for the U.S. Army Corps of Engineers, Vicksburg District.

Principal Investigator; Evaluation and National Register Nomination of Three Historic Shipwrecks, Lake Superior, Minnesota. Performed for the Minnesota Historical Society.

Co-Principal Investigator; Diving Investigations at the Port Mansfield Jetties. Performed for the U.S. Army Corps of Engineers, Galveston District, under contract with Coastal Environments, Baton Rouge, Louisiana.

Co-Principal Investigator; Historic Resources Survey and Documentation of the Meridian and Bigbee Railroad Bridge, Tombigbee River, Alabama. Performed for the U.S. Army Corps of Engineers, Mobile District.

Co-Principal Investigator; Relocation and Evaluation of Two Anomalies in Lavaca Bay, Texas. Performed for Engineering Sciences, Inc. Houston, Texas, with Coastal Environments, Inc.

1991

Co-Principal Investigator; Underwater Investigations-Channel to Red Bluff, Jackson County, Texas. Performed for the U.S. Army Corps of Engineers, Galveston District (with Coastal Environments, Inc.).

Principal Investigator; Underwater Archaeological Remote Sensing Sample Survey, Oregon Inlet Jetties, Mateo Bay Project, Dare County, North Carolina. Performed for the U.S. Army Corps of Engineers, Wilmington District (with GAI Consultants, Inc.).

Co-Principal Investigator; Magnetometer Survey and Ground Truthing Anomalies, Corpus Christi Ship Channel, Arkansas and Nueces Counties, Texas. Performed for the U.S. Army Corps of Engineers, Galveston District (with Coastal Environments, Inc.).

Co-Principal Investigator; Phase I Documentary Research, Atchafalaya Bay, Louisiana Shell Dredging Environmental Impact Statement for Dravo Basic Materials Company, New Orleans.

Field Director; Phase II Evaluation of Three Submerged Vessels Within Chesapeake Bay, Maryland for the U.S. Army Corps of Engineers, Baltimore District (subcontract with Goodwin & Associates, Frederick, Maryland).

Field Director; Underwater Archaeological Investigations of a Submerged Wooden Structure, Pensacola Naval Air Station, Florida. Performed for the U.S. Navy under subcontract to PCL Civil Constructors, Inc., Plantation, Florida.

1990

Principal Investigator; Underwater Inspection of Seven Historic Sailing Vessels, Port Johnson, Bayonne Reach, New Jersey. Conducted for the New York District U.S. Army Corps of Engineers by Panamerican Consultants, Inc., Tuscaloosa, Alabama under subcontract to Alpine Seismic Survey, Inc., Norwood, New Jersey.

Co-Principal Investigator, National Register of Historic Places Eligibility Assessment of the wrecks *Madeira* and *Thomas Wilson*, Lake Superior. Conducted for the Minnesota Historical Society by Panamerican Consultants, Inc., Tuscaloosa, Alabama.

Principal Investigator; Identification and Assessment of Twenty-Five Remote Sensing Targets, Offshore Asbury Park to Manasquan, Monmouth County, New Jersey. Conducted for the New York District U.S. Army Corps of Engineers by Panamerican Consultants, Inc., Tuscaloosa, Alabama under subcontract to Alpine Seismic Survey, Inc., Norwood, New Jersey.

Principal Investigator; Excavation of a Nineteenth Century Schooner Freeport, Texas. Conducted for Tejas Power Corporation, Houston, Texas by Panamerican Consultants, Inc., Tuscaloosa, Alabama.

Principal Investigator; Phase I and II Cultural Resources Investigations, Dorothea Bay, St. Thomas, U.S. Virgin Islands. Conducted for Panamerican Consultants, Inc.

Field Director; Mitigation of the Mt. Welcome Plantation Site, Christiansted, St. Croix, U.S. Virgin Islands. Conducted for Panamerican Consultants, Inc.

Principal Investigator; Marine Archaeological Survey, Compass Point, St. Thomas, U.S. Virgin Islands. Conducted for Panamerican Consultants, Inc.

Field Director; Investigation of Submerged Anomalies off Virginia Point, Galveston Bay, Texas. Conducted for Espey, Huston, & Associates, Inc.

Principal Investigator; Preliminary Assessment of Wooden Hulled Schooner off Freeport, Texas. Conducted for Texas Power Corporation.

Principal Investigator; Archival Research on the Maritime History of Natchez, Mississippi, Relative to the Identification of Seven Sunken Watercraft at the Town's Landing. Conducted for Coastal Environments, Inc., Baton Rouge, Louisiana.

1989

Principal Investigator; Underwater Cultural Resources Investigations, Blackwater River, Bagdad, Florida, for Blackwater Prestressed Concrete.

Co-Principal Investigator; Terrestrial and Underwater Cultural Resources Investigations, Inner Brass Island and at the site of a Proposed Pier at Hull Bay, St. Thomas, U.S. Virgin Islands, for Virgin Islands Cay, Limited, with Garrow and Associates, Inc.

Consultant; Underwater Archaeological Survey of the Fredericksted Cruise Ship Pier Extension Area, Fredericksted, St. Croix, U.S. Virgin Islands, for Panamerican Consultants, Inc.

Consultant; Underwater Archaeological Survey of the Proposed Radisson Hotel Riverwalk Extension, Savannah, Georgia, for Panamerican Consultants, Inc.

Principal Investigator; Archival Research Investigation Relative to the Identification of Two Sunken Watercraft, Delta, Louisiana, for Coastal Environments, Inc., under contract to the Vicksburg District Corps of Engineers.

Field Director; Underwater Archaeological Investigation of the Proposed Yacht Haven Marina Expansion, Charlotte Amalie Harbor, St. Thomas, U.S. Virgin Islands, for Panamerican Consultants, Inc.

1988

Field Director; Underwater Archaeological Excavation of the *C.B. Comstock*, a Late 19th Century Hopper Dredge, Surfside, Texas, for Coastal Environments, Inc., under contract to the Galveston District Corps of Engineers.

Field Director; Submerged Cultural Resources Investigation, Old Schooner Channel, Christiansted, St. Croix, U.S. Virgin Islands for Island Resources Foundation under contract to the U.S. Virgin Islands Port Authority.

Co-Principal Investigator; Submerged Cultural Resources Survey of a Proposed Sewage Pipeline, Protestant Cay Hotel, Christiansted, St. Croix, U.S. Virgin Islands.

Project Archaeologist; Submerged Cultural Resources Investigation, Puget Sound, Washington for Evans-Hamilton, Inc., under contract to the Seattle District Corps of Engineers.

1987

Co-Director; UAC Remote Sensing Survey of Long Beach Harbor, Los Angeles, California for the Los Angeles District Army Corps of Engineers.

Co-Director; UAC Excavation of a Gold Rush Era Sailing Vessel, Sacramento, California for the California Department of Parks and Recreation.

Director; Testing and NRHP assessment of five shipwrecks, Newark Bay, New Jersey for the New York District Army Corps of Engineers.

Director; Survey and inspection of four shipwrecks, Newark Bay, New Jersey for the New York District Army Corps of Engineers.

Principal Investigator; Cultural Resources Survey Matagorda Island State Park and Wildlife Management Area for Graham Production Company by EH&A.

1986

Field Director; Cultural Resources Survey Milam Count, Texas for Texas Utilities Generating Company by EH&A.

Principal Investigator; Cultural Resources Survey Chambers County, Texas for Walter Oil and Gas Company by EH&A.

Principal Investigator; Cultural Resources Survey Orange County, Texas for Houston Oils and Minerals by EH&A.

Principal Investigator; Cultural Resources Survey Travis County, Texas for City for Austin by EH&A.

Principal Investigator; Side Scan Sonar Survey and Inspection of Submerged Targets, "Docks Area," Sacramento, California for the Sacramento Housing and Redevelopment Agency by EH&A.

Principal Investigator; Side Scan Sonar Survey and Inspection of Submerged Targets, "State Area," Sacramento, California for the Sacramento Housing and Redevelopment Agency by EH&A.

1985

Field Director; Cultural Resources Survey Travis County, Texas for Bee Caves Partners, Limited by EH&A.

Assistant Field Director; Remote Sensing Survey and Investigation of Anomalies and Submerged Confederate Obstructions, Mobile Bay, Alabama for the Mobile District Army Corps of Engineers by EH&A.

Field Director; Cultural Resources Survey Victoria and Refugio Counties, Texas For Victoria County Electric Cooperative by EH&A.

Field Director; Cultural Resources Survey Travis County, Texas for Barnes Connally Investments by EH&A.

1984

Field Director; Cultural Resources Survey Travis County, Texas for Hurst Interests, Inc. by EH&A.

Principal Investigator; Investigation of two shipwrecks, Sacramento California for the Sacramento Housing and Redevelopment Agency by EH&A.

Magnetometer Operator; Magnetometer Survey, Lake Henry, Fort Hood, Texas for the Galveston District Army Corps of Engineers by EH&A.

Assistant Field Director; Test Excavations of Two Confederate Vessels, Mobile Bay, Alabama for the Mobile District Army Corps of Engineers by EH&A.

Principal Investigator; Cultural Resources Survey Harris County, Texas for R.G. Miller Engineers, Inc. by EH&A.

Field Director; Cultural Resources Survey Travis County, Texas for John Lewis Development by EH&A.

1983

Assistant Field Director; Assessment of Submerged Anomalies, Mobile Bay, Alabama for the Mobile District Corps of Engineers by EH&A.

Field Director; Cultural Resources Survey Travis County, Texas for Steger and Bizzoll, Inc. by EH&A.

Field Director; Cultural Resources Survey Travis County, Texas for Provident Development Company by EH&A.

1982

Nautical Archaeologist; Institute of Nautical Archaeology Excavation of the Molasses Reef Wreck, Turks and Caicos Islands, BWI.

1981

Teaching Assistant; Institute of Nautical Archaeology, Texas A&M University, College Station, Texas.

Archaeologist; Cultural Resource Management Section, Texas A&M University, College Station, Texas.

1980

Crew Chief; Excavation of Fort San Fernando de las Barancas, Tennessee Department of Archaeology, Memphis, Tennessee.

PUBLICATIONS

1999

National Register Of Historic Places Eligibility Evaluations Of Targets 3B-2-2 and 3B-2-6 Located Within Item 3B-2 of the Upper Yazoo Projects And Limited Survey And National Register Of Historic Places Eligibility Evaluations Of All Bridges, Structures, And Targets 4-6, 4-7, 4-11, 4-12, 4-15, and 4-16 Located Within Item 4 of the Upper Yazoo Projects, Yazoo River, Leflore County, Mississippi. Prepared for the U.S. Army Corps of Engineers, Vicksburg District by Panamerican Consultants, Inc.

Remote Sensing Survey and Archaeological Assessment of Submerged Cultural Resources Associated With the Battle of Johnsonville. For The Tennessee Department of Environment and Conservation, Division of Archaeology. By Panamerican Maritime L.L.C., Memphis, Tennessee. With Michael C. Tuttle and Michael C. Krivor.

Cultural Resources Survey, New York Harbor Collection and Removal of Drift Project, Arthur Kill, New York Reach; Arthur Kill, New Jersey Reach; and Kill Van Kull, New York Reach. Prepared for the U.S. Army Corps of Engineers, New York District (DACW51-95-D-0024) by Panamerican Consultants, Inc.

1998

Recordation and Assessment of a Historic Tennessee River Watercraft, Humphreys County, Tennessee. Submitted to the Tennessee Division of Archaeology foy Raise the Gunboats, Inc., Camden, Tennessee, by Panamerican Maritime, Memphis, Tennessee. With Michael C. Krivor

Recordation and Assessment of a Historic Watercraft at the Ben Sherrod Project Site. Prepared for the Penelore Corporation, Columbus, Mississippi, by by Panamerican Maritime, Memphis, Tennessee. With Michael C. Krivor.

Phase I Underwater Archaeological Survey, Sacramento River, Sacramento, California. For EIP Associates, Sacramento, California. By Panamerican Maritime, Memphis, Tennessee. With Michael Tuttle.

The History and Archaeology of the Nineteenth Century Steamer Mary Summers. With Charles E. Pearson and J. Barto Arnold.

1997

Cultural Resources Remote-Sensing Survey of the Navigation Channel Within Pools 3, 4, and 5 of the Red River Waterway, Louisiana. With Michael C. Tuttle, and Amy Mitchell. Prepared for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-91-D-0017.

Terrestrial and Remote Sensing Investigations, Proposed Site of Harrah's Casino and Motel, Shreveport, Louisiana. Prepared for Harrah's Entertainment, Memphis, Tennessee in Conjunction with Precision Cartographics, Shreveport, Louisiana.

Magnetometer and Sidescan Sonar Survey of the Sunflower River System Including the Big Sunflower, Little Sunflower, Quiver, and Bogue Phalia Rivers, Mississippi. Prepared for the Vicksburg District, U.S. Army Corps of Engineers, Contract No. DACW38-96-R-0007.

1996

Cultural Assessment of Wrecks In The Potential Expansion Area For The Mud Dump Site In The New York Bight Apex. Prepared for Batelle Ocean Sciences, Duxbury, Massachusetts.

Underwater Archaeological Investigations at the Site of the 1733 Spanish Fleet Shipwreck Tentatively Identified as the San Felipe: An Indiana Field School. Prepared by Panamerican Consultants in conjunction with Indiana University. Charlie Beeker co-author.

1995

Archaeological Data Recovery at the Fig Island Channel Site, Savannah Harbor, Georgia: A Technical Synthesis. Submitted to the Savannah District Corps of Engineers by Panamerican Consultants, Inc.

Underwater Archaeology of the Wreck of the Steamship Mary (41NU252) and Assessment of Seven Anomalies, Corpus Christi Entrance Channel, Nueces County, Texas. Submitted to the U.S. Army Corps of Engineers, Galveston District by Coastal Environments, Inc., Baton Rouge, Louisiana. With Pearson et al.

Historical Assessment and Magnetometer Survey for Dike Construction at Six Locations Along the Mississippi River: Victoria Bend, Below Prentiss, Chicot Landing, Warfield Point, Vaocluse, and Refuge Dikes. Submitted to the Savannah District Corps of Engineers by Panamerican Consultants, Inc.

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1994

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1993

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1992

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1991

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1990

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1989

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1988

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1987

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1985

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From Caravels to Cenotes: Ongoing Archaeological Research in the Dominican Republic. Presented at the Conference on Underwater and Historical Archaeology, Corpus Christi, Texas, 1997.

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Archaeological Investigations of the Underwater Science and Educational Resources Program: Emphasis and Implications. Presented at the Conference on Underwater and Historical Archaeology, Kansas City, Missouri, 1993.

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The Underwater Survey of Old Sacramento's Riverfront: A Litmus of Professional Attitudes and Interactions, Presented at the Conference on Underwater and Historical Archaeology, Sacramento, California, 1986.

A Reassessment of the Chronological and Typological Framework of the Spanish Olive Jar,
Presented at the Conference on Underwater and Historical Archaeology, Boston
Massachusetts, 1985.

LANGUAGES

Spanish (Resided in Puerto Rico for five years.)

APPLICABLE EXPERIENCE/CERTIFICATIONS

NAUI 1969 Basic Scuba Certification No. 85436
NAUI 1986 Diver Rescue Certification No. SP15192
Red Cross CPR & First Aid
DAN Oxygen Administration

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Cover illustration: Ceramic human effigy fragment recovered during PCI's Phase III data recovery at the East Nashville Mounds site (40DV4), Nashville, Tennessee. Conducted for the Tennessee Department of Transportation.

PANAMERICAN CONSULTANTS, INC. CULTURAL RESOURCES MANAGEMENT

INTRODUCTION

Panamerican Consultants, Inc. (PCI), is a State of Alabama registered corporation specializing in cultural resource management and archaeological research. Formed in 1989, PCI has successfully performed hundreds of individual cultural resource contracts, both terrestrial and maritime, ranging from small reconnaissance surveys up to full-scale archaeological mitigation within the continental United States, Pacific, and Caribbean regions.

PCI provides cultural resources services to federal and state agencies and private entities. PCI is particularly qualified to provide services including, though not limited to, the following:

Cultural Resources Planning Studies

- ❖ *Phase I surveys*
- ❖ *Phase II testing*
- ❖ *Phase III data recovery or mitigation*
- ❖ *Evaluation of standing structures*
- ❖ *Preparation of state site forms (archaeological and architectural)*
- ❖ *Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation*
- ❖ *Preparation of Historic Preservation Plans (HPP) or Cultural Resources Management Plans*

Landscape Inventories and Evaluations

- ❖ *Inventories of cultural and natural landscapes*
- ❖ *Application of National Register of Historic Places (NRHP) criteria of evaluation*

Client Management Concerns

- ❖ *Mitigation plans*
- ❖ *Preparation of Memoranda of Agreements (MOAs)*
- ❖ *Completion of National Register nomination forms*

Database Design and Management

- ❖ *Cultural material inventories and field data*
- ❖ *Artifact attributes*
- ❖ *Intrasite and intersite distributions*
- ❖ *Statistical analysis*
- ❖ *Geographic Information System (GIS) applications*

PCI offers full corporate capability to respond to clients' needs. This includes our corporate headquarters in Tuscaloosa, Alabama, with branch offices in Memphis, Tennessee; Tampa, Florida; and Buffalo (Depew), New York. PCI has performed cultural resources investigations in the continental United States and its territories and protectorates, e.g., Puerto Rico, the U.S. Virgin Islands, and the Marshall Islands. PCI has a proven record of successfully conducting and managing projects, and of completing all required tasks in a professional, efficient, timely, and cost-effective manner. In addition, our staff is fully trained and aware of the issues, theory, practice, legislation, and laws that guide cultural resource management (CRM) work.

PCI maintains high standards in the production of quality technical reports and supporting graphics. Our permanent staff are individuals of proven ability in the production of HABS/HAER-quality technical architectural drawings and photography. Laser printer output and high-quality reproduction assure readable, professional-level text and illustrations. Reports are supported by quality photography and technical drawings. PCI's reports meet or exceed current professional standards within the discipline. Our reports follow the *American Antiquity* style sheet, unless otherwise requested, and are suitable for publication.

With one of the largest professional underwater archaeological staffs of any cultural resources management firm in the United States, our affiliate, Panamerican Maritime, has successfully performed over sixty individual maritime cultural resources contracts ranging from small remote sensing surveys to full-scale shipwreck excavations within the continental United States and the Caribbean region.

Panamerican Maritime's capabilities encompass all levels and types of investigations, including archival and historic research, remote sensing survey and data analysis, underwater target and anomaly

PANAMERICAN
CONSULTANTS,
INC.

PANAMERICAN
MARITIME,
LLC.

PANAMERICAN
ENVIRONMENTAL,
INC.

COMPANY
FACILITIES

location and identification, assessment of potential significance of underwater sites and features, site testing, and data recovery. These investigations have been conducted in offshore, coastal, estuarine, and riverine environments throughout the Atlantic, Gulf, and Pacific seaboard of the U.S., the Great Lakes, and the Caribbean, including the Chesapeake Bay, Pamlico Sound, and offshore waters adjacent to the outer banks of North Carolina. This experience gives Panamerican archaeologists in-depth knowledge concerning the assessment of site significance and integrity, as well as the equipment types best suited for the environment of a specific project.

PCI's other separately owned affiliate, Panamerican Environmental, Inc., provides a broad range of environmental services including environmental assessments, health and safety plans, monitoring and regulatory compliance, pollution prevention plans, geologic and hydrologic assessments, Phase I and Phase II environmental assessments, wetlands delineations, and geographic information systems (GIS) applications to private sector and government clients. This includes developing safety, health, and accident prevention plans and procedures for cultural resource investigations and archaeological surveys conducted in hazardous environments. PEI's senior personnel have more than 60 years combined professional experience in environmental consulting, academic, and government agency workplaces.

PCI's corporate headquarters is located in Tuscaloosa, Alabama. Our 4,500-square-foot, electronically protected commercial building at 924 26th Avenue East contains complete office, drafting, darkroom, primary conservation and laboratory facilities, as well as an extensive research library. PCI has installed environmental controls and a fire/burglary security system linked 24 hours a day to a monitoring service. Thus, while the company's role in curation is that of interim storage facility, all government-required systems and controls for permanent curation facilities are present. The Tuscaloosa office is staffed by a senior archaeologist, five staff archaeologists, and an architectural historian.

The 3,500-square-foot Memphis office, located at 15 South Idlewild Street, also contains complete office and laboratory facilities. The laboratory is furnished with appropriate artifact processing and analysis equipment and the offices with photocopying and computer

equipment. The Memphis office is staffed by a senior archaeologist and three staff archaeologists. It is also the home office of PCI's affiliate, Panamerican Maritime, LLC, providing the full range of underwater archaeological services.

PCI's northeast facility is located at 36 Brunswick Road in Depew (Buffalo), New York. The office is equipped with the necessary laboratory, computer, and office equipment to conduct analysis and produce technical reports. The Buffalo office is staffed by a senior archaeologist, three staff archaeologists, and a historian. It is also the home office of PCI's affiliate, Panamerican Environmental, Inc., providing environmental and health and safety services.

The Florida office, located at 1207 North Himes in Tampa, also contains complete office, research library, and laboratory facilities necessary to conduct analysis and produce technical reports. The Tampa office is staffed by a senior archaeologist, laboratory, and editorial staff.

Computer facilities include IBM-based and Macintosh workstations. These are supported by word processing, GIS, computer-aided drafting, and desktop publishing software, as well as full-page scanners, digitizing equipment, digital cameras, and color laser printer peripherals. Panamerican archaeologists and field personnel have experience with and access to a comprehensive array of field equipment. We have conducted field investigations using both relatively simple equipment and state-of-the-art technology, such as global positioning systems, total station surveyor's instrumentation, terrestrial magnetometry, and large-scale excavation equipment. By tailoring equipment needs to the requirements of each project relative to site conditions and the scope of work, we are able to successfully complete projects in a prompt and professional manner, according to the highest standards of the discipline.

With our permanent staff of 25 professionals, PCI can easily support a number of projects concurrently. Our extensive list of research consultants and skilled field and laboratory personnel enables us to staff projects with individuals particularly suited to project needs. PCI offers experienced field crews and support staff together with rapid mobilization, technical expertise, and proven excellence in the final product. Our archaeologists have experience within the continental United States and Pacific and Caribbean regions, along

RESEARCH
CAPABILITIES

ARCHIVAL AND
HISTORIC
RESEARCH

with varied and complementary research specialties and areas of expertise. Our offices maintain regular contact with cultural resource managers and State Historic Preservation Offices in individual states to stay abreast of cultural resource planning and management goals.

Illustrating our capabilities in this area of expertise, the PCI staff and core team members have assisted numerous federal agencies (e.g., the U.S. Army Corps of Engineers, U.S. Navy, National Park Service, Air National Guard, U.S. Forest Service, and National Resources Conservation Service), local governments, state agencies, and private sector clients in complying with and implementing federal and state laws and regulations. PCI's capabilities include all levels and types of investigation, including archival and historical research; survey, site testing, and data recovery; architectural assessment; preparation of technical reports and architectural drawings; and preparation of National Register of Historic Places nomination forms.

PCI also maintains and compiles numerous databases designed for maximum results and uses special technology, such as Geographic Information Systems (GIS) and Differential Global Positioning Systems (DGPS), in order to maximize results and provide usable data to our clients. Along with our field capabilities, PCI operates fully equipped laboratories that allow for in-depth analysis of artifacts and rapid turnaround on reports.

As a part of PCI's goal of excellence, our field, laboratory, and administrative work meets accepted professional standards in accordance with Standards and Guidelines established in 36 CFR Part 66, Recovery of Scientific, Prehistoric, Historic, and Archeological Data: Methods, Standards and Reporting Requirements (Federal Register 1977 [42]:19) and Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (Federal Register 1984 [190]:44,716-744,752).

Each archaeologist on staff at PCI has a broad range of experience in the area of background and literature searches. This, coupled with intimate knowledge of the archaeological literature, assures that projects are carried out within a framework utilizing current data and state-of-the-art approaches tailored to the needs of particular project and research goals. Beyond these basic requirements for adequate research, staff members also have particular expertise in other areas of document research and oral history collection. In order

to produce the highest level of research possible, the company staff also consults with qualified individuals for particular research expertise. Our full-time historian provides in-house expertise for in-depth historical studies.

Examples of archival and historic research conducted by PCI are:

- ❖ A comprehensive cultural resources inventory of eleven islands within the United States Army Kwajalein Atoll, Republic of the Marshall Islands. This survey was comprised of intensive archival research, interviews with veterans of the Kwajalein Atoll Battles, and a comprehensive pedestrian survey. (U. S. Army Space and Strategic Defense Command, Environmental and Engineering Office, under contract to Earth Tech).
- ❖ An intensive archival and historic investigation of the U.S. Marine Corps Recruit Depot at Parris Island, South Carolina, focusing on the Civil War and Postbellum periods (1862 to 1892). Archaeologically sensitive areas dating to this time period were identified. (U. S. Army Corps of Engineers, Savannah District).
- ❖ Historical research to help assess the potential eligibility for inclusion in the National Register of Historic Places of 49 known historic archaeological sites located within the right-of-way of the 3P section of the Natchez Trace Parkway, Mississippi. (National Park Service, Southeast Archaeological Center).

PCI's archaeologists have extensive experience in the design and implementation of cultural resource surveys, and in the analysis and synthesis of resulting data. Our archaeologists have directed dozens of cultural resource surveys ranging from the small reconnaissance level to large-scale intensive investigations using the full suite of sampling and location strategies.

An on-the-ground reconnaissance of a specific project area is intended to verify the locations and current conditions of previously recorded sites listed on or exhibiting a high potential for listing on the National Register of Historic Places, to aid in the formulation of site distribution/type predictions, and to test previously formulated site models. Data produced by reconnaissance surveys are often intended for incorporation into documents such as environmental impact statements.

SURVEY

RECONNAISSANCE
SURVEYS

PHASE I
CULTURAL
RESOURCE
SURVEYS

Examples of reconnaissance surveys conducted by PCI are:

- ❖ An archaeological and historical reconnaissance of the Tennessee-Tombigbee Wildlife Mitigation Lands, Mobile-Tensaw Delta, Alabama. A research design and models of site location and formation were developed to aid future research efforts in the region. (U. S. Army Corps of Engineers, Mobile District).
- ❖ Phase IA survey of the Veteran's Drive Improvements, St. Thomas, United States Virgin Islands. This reconnaissance-level survey, which also included a ground-testing component, was conducted in the Charlotte Amalie Historical District. (Parsons, Brinckerhoff, Quade & Douglas, Inc.).
- ❖ Cultural Resources Reconnaissance, Yazoo Delta Project (Sunflower and Quiver Rivers). The primary goal of this project was to compile all existing archaeological data for an approximately 1,309 km² area, which encompassed 119 previously identified sites, in Oliver, Leflore, Sunflower, Tallahatchie, and Washington counties, Mississippi. (U. S. Army Corps of Engineers, Vicksburg District).

Phase I surveys are intended to provide a complete examination of a particular area in order to provide an inventory and assessment of all cultural resources present, whether previously known or newly discovered. These resources include both archaeological sites and standing structures or other above-ground objects. One of the primary concerns of intensive surveys is an evaluation of site significance based on National Register of Historic Places eligibility criteria.

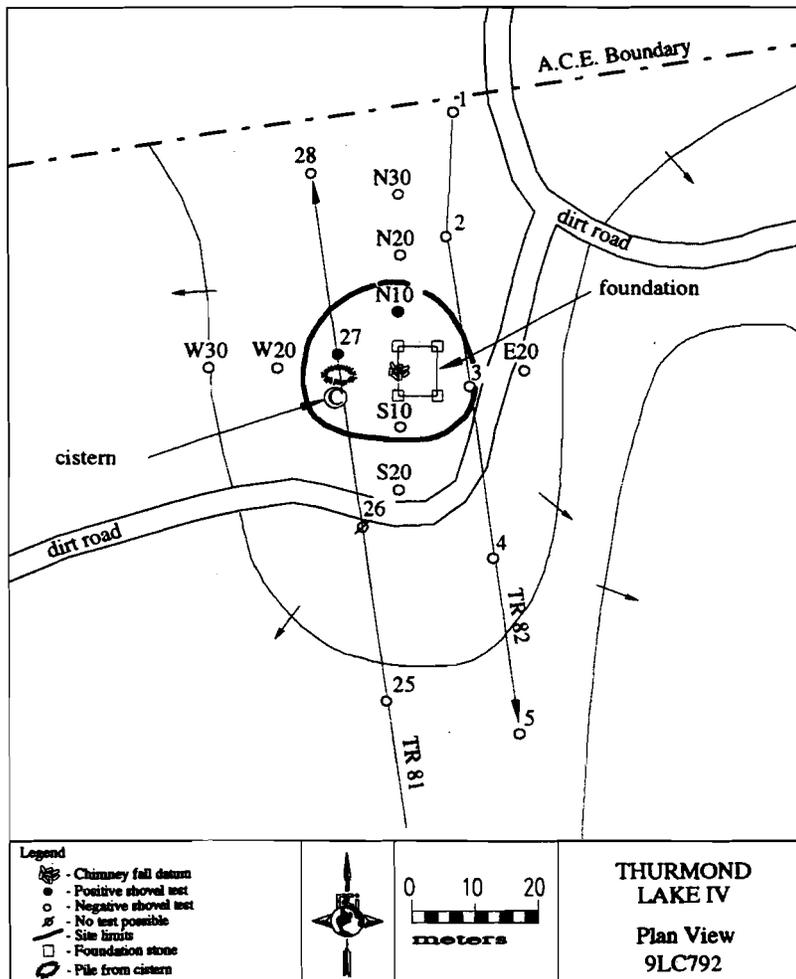
This type of cultural resources investigation is perhaps the most common one requested. Typically, these survey efforts are comprised of a background literature search to compile existing site data for a specific locale, intensive-level physical inspection of the project area, recording of both prehistoric and historic sites and structures, and assessment of National Register eligibility.

Examples of Phase I surveys completed by PCI include:

- ❖ Intensive Phase I survey of 7,105.2 ha. at Fort Benning Military Reservation, Alabama and Georgia, for fulfillment of 12 separate work orders. During the course of this work, 443 sites were investigated and documented. (National Park Service, Southeast Regional Office).
- ❖ Intensive Phase I survey of 31,950 acres at J. Strom Thurmond Lake in McCormick County, South Carolina, and Lincoln, Wilkes, and Elbert counties, Georgia. A total of 1,064 archaeological sites were recorded during this survey, and the reports included discussions of previous

research in the area and comparisons with work conducted on the Richard B. Russell Reservoir to the north. (U. S. Army Corps of Engineers, Savannah District).

- ❖ A Phase I cultural resource survey and architectural inventory at Seneca Army Depot, New York, of approximately 700 acres, including the airfield. Surface and subsurface field survey by a hazardous waste trained archaeological field director and crew in addition to identifying any areas of potential contamination and areas with unexploded ordnance within the study area. (U. S. Army Corps of Engineers, New York District).

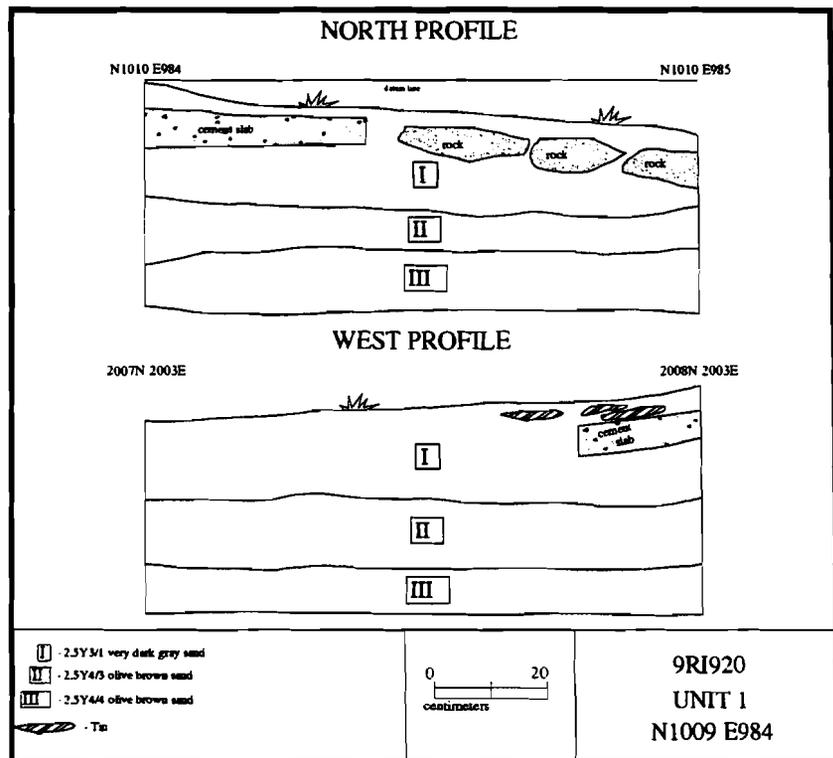


Example of a site map produced for a survey report. This map, generated during the Phase I survey of 7,526 acres at Thurmond Lake, South Carolina, was produced using AutoCAD®.

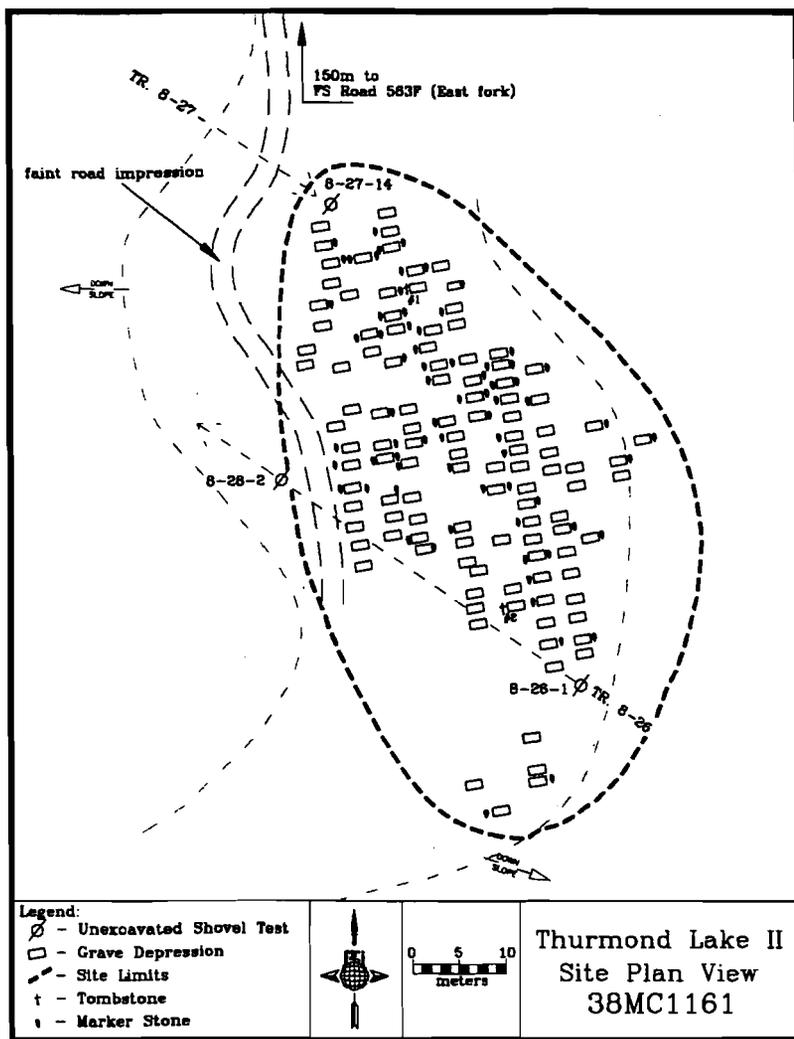
PHASE II
CULTURAL
RESOURCE
TESTING AND
EVALUATION

A normal progression occurs from cultural resources surveys, in which potentially eligible sites are located, to a site testing and evaluation program designed to clearly determine a site's eligibility for the NRHP. These studies involve both prehistoric sites and historic archaeological sites containing no above-ground remains, as well as historic buildings and structures. The impetus of the testing phase is to evaluate a site's range of cultural materials, depositional characteristics, archaeological/architectural features, overall integrity, and to provide sufficient information to guide Phase III investigations, if needed, in light of the eligibility criteria set forth in the NRHP requirements.

Example of profile drawings from a Phase II investigation of Site 9R1920, Fort Gordon, Georgia. Illustration produced using AutoCAD®.



Methods typically used for sites with no standing structural remains include controlled surface collection, test unit excavation, and/or machine-assisted plowzone removal. Methodologies are adjusted to meet the demands of a particular site. Field procedures are detailed in a research design or proposal agreed upon between the client's technical representatives and the principal investigator prior to the initiation of fieldwork. Consultants may be employed for specialties such as radiocarbon dating, paleobotanical analysis, or zooarchaeological analysis.



Example of a site map produced for a survey report. This map, generated during the Phase II survey of 7,526 acres at Thurmond Lake, South Carolina, was produced using AutoCAD®.

Sites with above-ground features, such as historic buildings or prehistoric earthworks, require a somewhat different methodological approach, one which augments the subsurface exploration techniques outlined above. A combination of accurate measurement and drawing, professional photo-documentation, and the input of specialists such as architectural historians or soil scientists, is required on such sites.

Examples of Phase II surveys completed by PCI are:

- ❖ Phase II testing of Site 38BU927, the Track Site, at Beaufort Marine Corps Air Station, Beaufort, South Carolina. This large, multicomponent, prehistoric site is eligible for the National Register of Historic Places. (U. S. Army Corps of Engineers, Savannah District).
- ❖ Phase II investigation of Sites 1MT275, 1MT276, and 1MT277, which fell within the planned construction limits of the Montgomery Outer

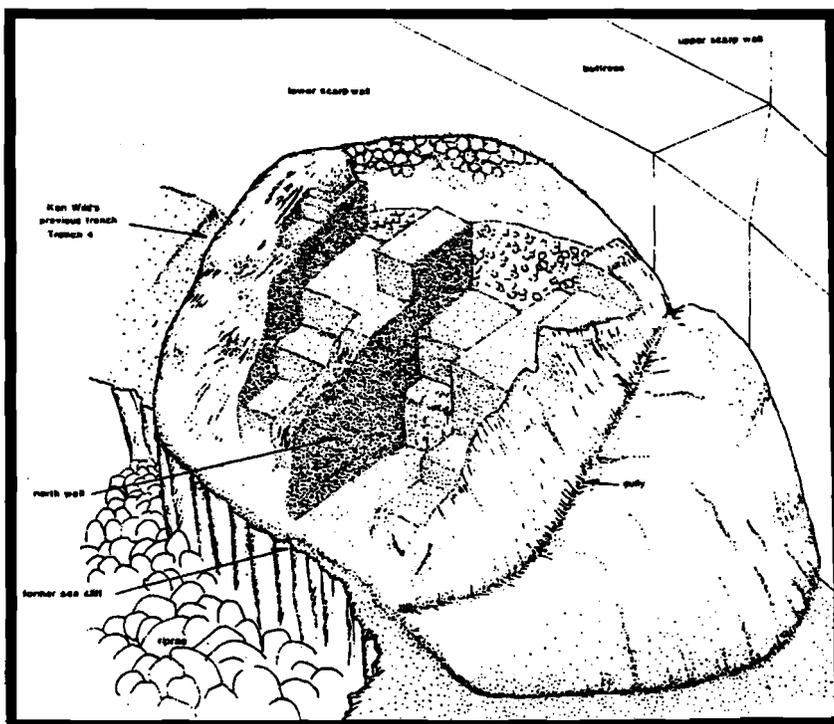
PHASE III
DATA RECOVERY
AND MITIGATION
OF ADVERSE
EFFECT

Loop highway project. All three sites, which were primarily prehistoric, were found to be eligible for the National Register of Historic Places. (Alabama Department of Transportation).

- ❖ Phase II cultural resource investigation of 18 historic and two prehistoric sites at Griffiss Air Force Base in Rome, Oneida County, New York. Six sites were determined to be eligible for the National Register of Historic Places. (Tetra Tech, Inc. [under contract to the U.S. Air Force]).

The performance of Phase III studies, cultural resources data recovery and mitigation, is essentially a combination and expansion of the various tasks outlined above and specialized studies such as geomorphology, and is designed to ameliorate adverse effects to a cultural resource. The successful conduct of mitigation projects, however, requires a higher level of company capabilities, personnel, equipment, and logistics. PCI has successfully performed numerous large-scale mitigation studies in both the U.S. and Caribbean regions. The mitigation program ensures that a maximum amount of information relative to archaeological, anthropological, and architectural aspects of the site is obtained. Prior to any fieldwork, an appropriate research design is developed and approved by the

Schematic of excavation conducted at Castillo de San Felipe del Morro, part of the San Juan National Historic Site, Puerto Rico.



appropriate SHPO. Mitigation plans and research designs are formulated to clearly state objectives and serve as guides to fieldwork. This includes a review of the culture history for the site area and a presentation of pertinent research themes.

Examples of Phase III projects completed by PCI are:

- ❖ Mitigation of the destruction of a portion of Site 1WA140 by the Corridor X highway project. The large set of data collected from the site was used to create a model to aid in the classification of Late Woodland components in the upper regions of northwest Alabama. (Alabama Department of Transportation).
- ❖ Archaeological data recovery at East Nashville Mounds (Site 40DV4) and the French Lick/Sulphur Dell site (Site 40DV5). This project involved extensive archival research and mitigation of adverse effect to portions of two Mississippian mound and village centers occupying opposite banks of the Cumberland River in downtown Nashville. (Tennessee Department of Transportation).
- ❖ Excavation of two middens at Castillo de San Felipe del Morro, one of the major Spanish Colonial military fortifications in the Caribbean. El Morro is part of the San Juan National Historic Site, Puerto Rico. (U. S. Army Corps of Engineers, Jacksonville District).

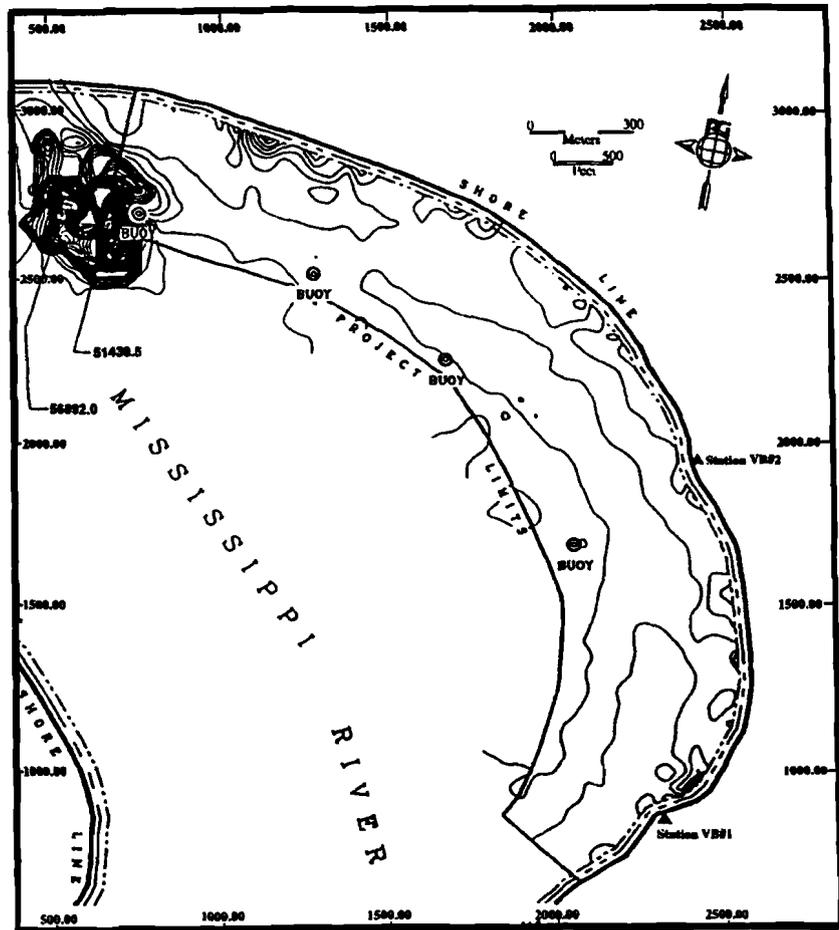
Maritime survey and survey using remote sensing surveys employing sidescan sonar and magnetometer are conducted to identify the presence or absence of potentially significant submerged cultural resources within a given project area. Panamerican personnel have extensive experience in remote sensing surveys using a variety of state-of-the-art equipment for projects ranging from small magnetometer surveys to complex, multicomponent investigations demanding the use of a full array of remote sensing instrumental packages.

We have conducted studies for the Mobile, Galveston, Wilmington, Vicksburg, Savannah, New York, and Jacksonville Districts of the Corps of Engineers under a wide range of conditions, including shallow-water riverine, high energy coastal, and offshore environments. In addition, Panamerican has been contracted by various petroleum and environmental companies to analyze geohazard survey data for the presence of submerged cultural resources in the Gulf Coast and Long Island Sound regions. Our clients have included ARCO Oil and Gas, Mobil Oil, K&C Offshore Surveys, Barry Vittor and Associates, Tejas Power Corporation, Exxon Corporation, and Gulf Ocean Services.

MARITIME
INVESTIGATIONS

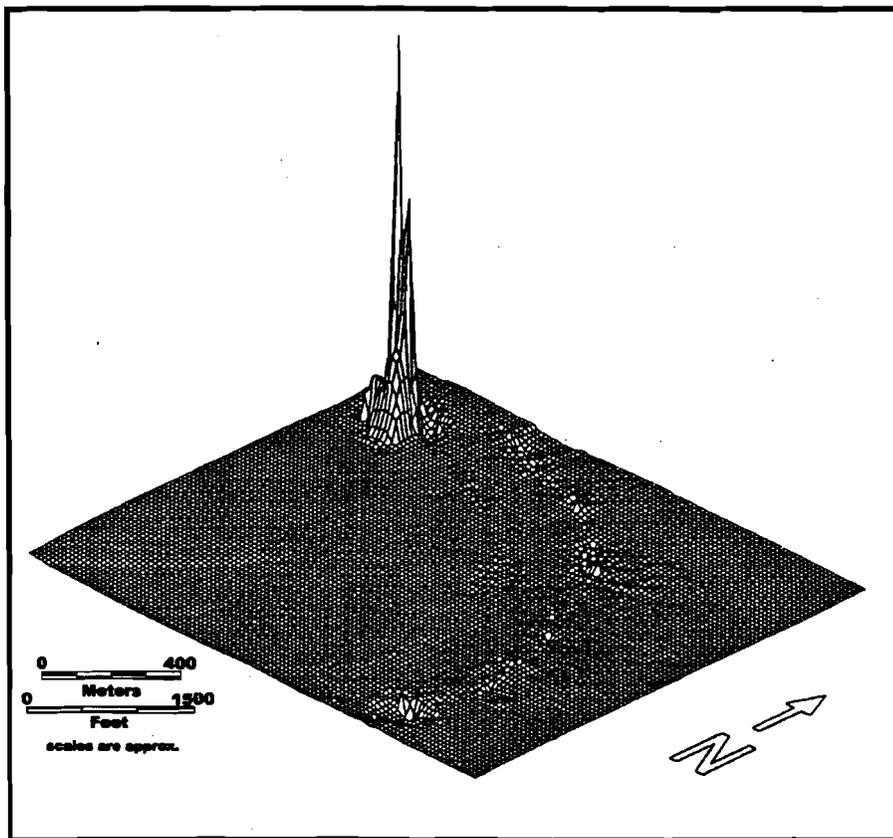
Our familiarity with currently available models of remote sensing equipment includes magnetometers, sidescan sonars, subbottom profilers, and fathometers, as well as requisite navigation systems such as DGPS (Differential Global Positioning Systems), microwave systems (Mini Ranger II, Del Norte), and range-azimuth systems (Laser Track and Geodimeter Total Station).

Two-dimensional magnetic intensity contour map for Victoria Bend, Mississippi survey area. The large anomaly in the upper left represents the magnetic signature from the wreckage of a modern steel barge.



Panamerican utilizes three marine magnetometers, an EG&G 806, and an EG&G 866 marine magnetometer, as well as an EG&G 856 portable land magnetometer. The 856 is a useful tool for both land projects and small shallow marine projects. Additionally, it is employed as a base station to adjust for diurnal variation when collecting data over an extended field period. Panamerican has navigational capabilities for large or small projects, as well as computer software capabilities to expedite the contouring of magnetic data in two and three dimensions. Our positioning

instruments include a Geodimeter Total Station for small-scale projects where range azimuth of less than two miles can be obtained, and a Motorola Differential Global Positioning System (DPGS) employed for larger projects. In the event that we require additional equipment or personnel for survey work, we have excellent working relationships with several marine survey companies that we have subcontracted with successfully on past projects. State-of-the-art subbottom profiler and sidescan sonar systems are leased from various geophysical companies for projects requiring these systems. Computerized range-range positioning/navigation systems also are provided under subcontract.



Three-dimensional magnetic intensity contour map for Victoria Bend, Mississippi survey area. The wreckage of a modern steel barge is graphically illustrated using Surfer®.

Past and current remote sensing survey projects directed and conducted by Panamerican include a magnetometer, sidescan and bathymetric survey of Pools 3, 4, & 5 of the Red River, Louisiana; a three-month magnetometer and sidescan survey at Oregon Inlet, considered one of North Carolina's most treacherous stretches of nearshore water; a magnetometer survey off Kure Beach, North

ANOMALY/
TARGET
LOCATION,
IDENTIFICATION,
AND ASSESSMENT

Carolina, for the USACE, Wilmington District; a magnetometer, sidescan, and subbottom profile survey of 120 line-miles off Long Island, for the USACE, New York District; a magnetometer and sidescan survey of approximately 60 line-miles offshore Port Aransas and within the Corpus Christi Bay system, Texas, for the USACE, Galveston District; magnetometer surveys of Compass Point Bay, St. Thomas, and the proposed cruise ship pier location, Frederiksted, St. Croix, both located in the U.S. Virgin Islands; and a magnetometer and sidescan survey of three bridge crossings in Mobile Bay for the Alabama Department of Transportation.

Panamerican's maritime archaeologists have extensive experience in diver location and identification of anomalies and targets recorded during remote sensing investigations. Upon completion of data analysis and identification of targets from the data that have a high probability of representing potentially significant cultural resources, a concerted effort of remote sensing reacquisition and diver identification of these targets is implemented. Priority targets are relocated employing a variety of methods, depending upon the specific project. Some targets require the deployment of a full array of remote sensing equipment for reacquisition, while other targets call only for simple positioning and diver location. Once the target or its general area is demarcated with positioning equipment, its position can be refined with either the sidescan sonar or the magnetometer.

Analysis of sidescan sonar features represent above-bottom targets and are relatively easily located by archaeological divers employing standard circle search techniques, once the feature's immediate location is positioned and buoyed. In the case of magnetometer targets with no sidescan sonar record, the position is buoyed and its location refined by further magnetometer survey, at times employing a diver-towed sensor. Once refined, either hydraulic or manual probing is conducted to identify specific location and depth below sediment. The anomaly is then excavated employing air lifts, venturi induction dredges, or water jets.

When priority sidescan features and anomalous targets are located, archaeological divers proceed with the target's identification. If the target is found to represent nonsignificant material, it is briefly recorded. This entails preliminary measurements and photo documentation, generally with a 35mm camera. If a target is

determined to represent a potentially significant resource, it is subjected to an extensive and comprehensive assessment which is described in the following subsection.

Paramount to any investigation of cultural resources is the question of personal safety. Panamerican emphasizes the importance of safety in all field endeavors, especially in projects involving diving, and has developed a Diving Safety Program that meets both USACE and OSHA standards for use in cultural resources investigations. This program has been approved by Diving Safety Officers for the Galveston, Mobile, Vicksburg, New York, and Savannah Districts. Two weeks prior to any diving project a "Diving Plan" developed specifically to the project's objectives and environment, is submitted to the USACE Diving Safety Officer for approval.

All Panamerican divers are archaeologists, as well as experienced divers. Most are schooled specifically in nautical and maritime archaeology, and all have project experience on numerous shipwreck sites. Our underwater archaeologists are intimately familiar and comply with the requirements of "Contract Diving Operations" (385-1-3). As stipulated by these regulations, all team members are currently certified in CPR and first aid, as well as the emergency administration of oxygen. Additionally, we certify our equipment annually and present these and certifications on air quality prior to commencement of field work. Panamerican carries all necessary insurance for the conduct of both terrestrial and underwater archaeology, including Longshoreman and Jones Act insurance required for maritime activities, and will provide Certificates of Insurance upon award of contract.

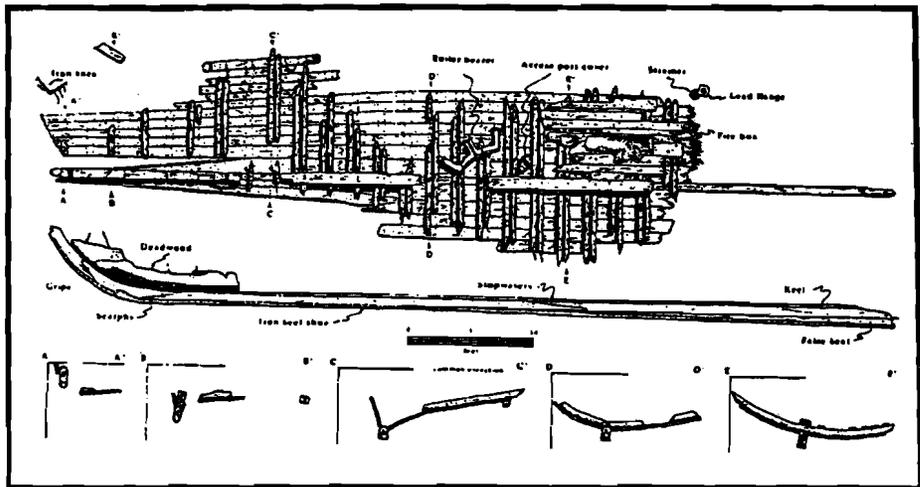
Specific examples of anomaly location, identification, and assessment include:

- ❖ Investigation conducted for Fluor Daniels, Inc., of Sugarland, Texas, this anomaly investigation assessed seven anomalies offshore Freeport, Texas. This entailed the repositioning of anomaly locations, additional magnetometer survey to refine the anomaly positions, and then diver location and identification. All anomalies were located and identified as modern debris.

- ❖ Under contract to Alpine Ocean Seismic, Inc., Panamerican relocated and assessed 26 magnetic and sidescan targets in the near shore sand placement area of the Atlantic Coast of New Jersey. Only one target,

MARITIME
HISTORICAL
SIGNIFICANCE
EVALUATION AND
MITIGATION

Plan, profile, and cross-sections of Vessel 21, a late nineteenth-century steam tug employed on the Savannah River. The vessel was recorded during a Phase III investigation for the USACE Savannah District.



the site of a well-preserved, late eighteenth-to late nineteenth-century copper-clad sailing vessel, was thought to be historically significant and potentially eligible for nomination to the National Register. Recommendations of avoidance or mitigation were presented.

Submerged targets determined to represent potentially significant resources undergo a preliminary but comprehensive investigation to determine the nature and integrity of the site. The assessment of potential significance is based on eligibility criteria for nomination to the National Register of Historic Places as specified in 36 CFR 60.4. In order to properly assess eligibility criteria, a program of limited test excavation, limited artifact recovery, mapping, and 35mm/video photo documentation is implemented. Employing established standards and procedures for conducting archaeological research that ensure maximum data retrieval, Panamerican's archaeologists carefully record all important information to facilitate the evaluation and interpretation of the site.

Once significance is determined and mitigation is required, a comprehensive data recovery program is initiated. The mitigation program ensures that a maximum amount of information relative to archaeological, anthropological, and architectural aspects of the site is obtained. Mitigation often includes intensive excavation, comprehensive mapping, artifact retrieval, photographic documentation, special sampling for analysis (e.g., wood and ballast), as well as additional archival research. Assessment or mitigation can include completion of National Register eligibility

forms. Panamerican personnel are extremely familiar with the forms and the process and have completed numerous National Register eligibility forms for various wrecks.

Materials recovered from submerged and wet-site environments are particularly sensitive to environmental changes and can be easily damaged by improper treatment. Proper handling of artifactual material is critical from the moment it is uncovered on the bottom until conservation is completed. Panamerican's staff archaeologists have had formal instruction and field experience in the conservation of archaeological materials. Consultants hired by Panamerican for field investigation of submerged sites are expected to be familiar with the proper techniques for dealing with artifacts from wet environments. Panamerican has established procedures for preliminary handling and treatment of artifacts prior to their transfer to a conservation facility.

Panamerican conducts all field investigations according to exacting professional standards with the highest regard for archaeological principles and personal safety. Paramount to any investigation of submerged cultural resources is the question of safety; Panamerican emphasizes this in all field endeavors. Given the increased threat of injury when working in and around water, Panamerican has developed a Water Safety Plan for use on all submerged cultural resource investigations. Our field investigators are committed to maintaining a safe working environment while achieving maximum data retrieval according to the highest professional standards.

Panamerican's archaeologists are thoroughly acquainted with U.S. Army Corps of Engineers and National Park Service guidelines for maritime cultural resources, as well as applicable state requirements for conducting archaeological investigations. Panamerican stays up to date with developments in preservation planning programs for both state and federal cultural resources management agencies.

PCI has extensive experience in standing structures assessment and in documentation for historic significance and eligibility for listing in the National Register of Historic Places. This includes field structure inventory surveys, recording and evaluation of National Register eligibility, preparation of architectural histories, HABS/HAER documentation, and preparation of National Register forms.

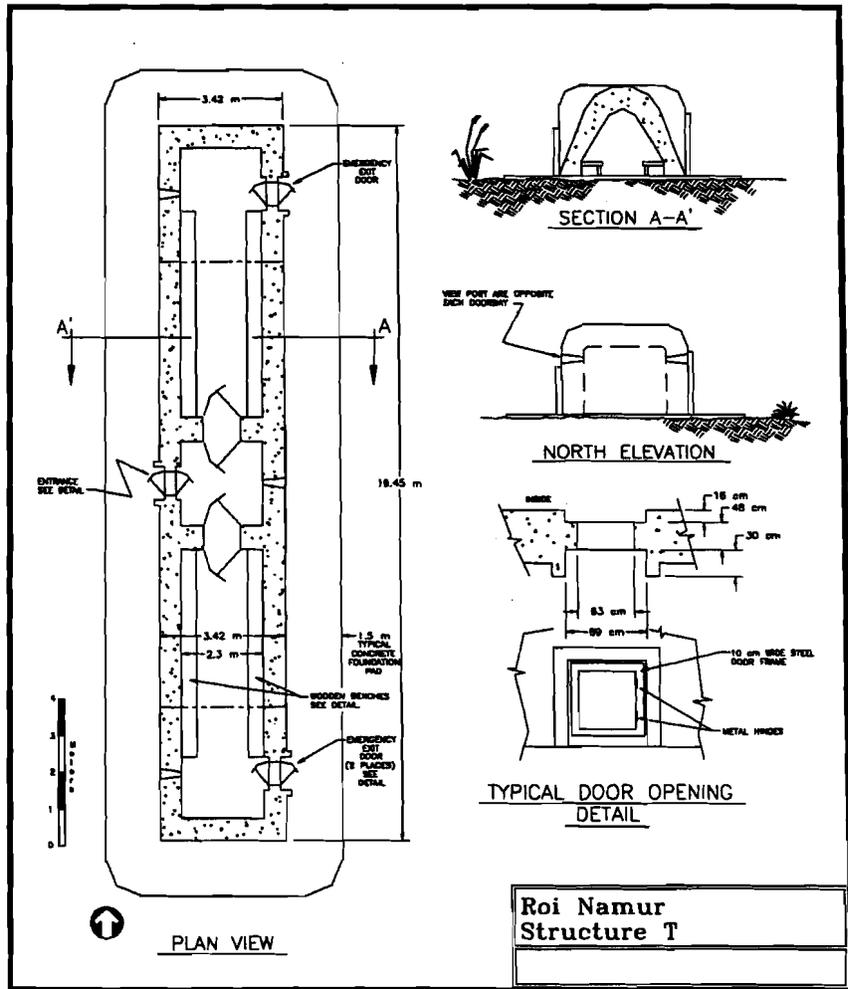
MARITIME
ARTIFACT
CONSERVATION

MARITIME
RESEARCH
METHODS

ARCHITECTURAL
ASSESSMENTS

PCI's architectural assessment reports include discussion of the physical environment, the historical and architectural context for the area, the methodology employed, a listing of all properties within the impact area, the potential affects on properties, and recommendations as to the eligibility of each structure.

Drawing of a Japanese concrete air raid shelter in the Kwajalein Atoll of the Marshall Islands. PCI conducted a comprehensive resources inventory of the World War II structures for the U.S. Army Space and Strategic Defense Command.



Examples of architectural assessments completed by PCI include:

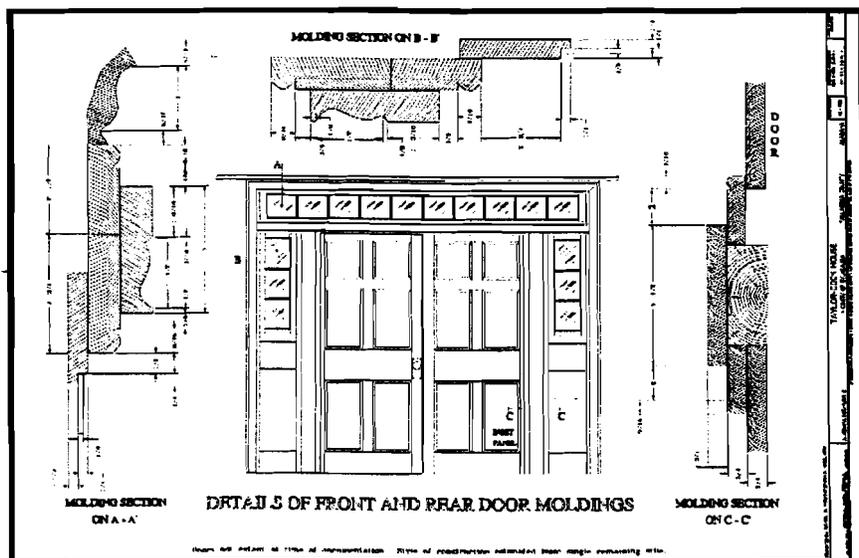
- ❖ Reconnaissance-level architectural assessment of 850 World War II military and civilian properties at Redstone Arsenal, Alabama. Buildings were evaluated according to National Register guidelines and U.S. Army regulations. (U. S. Army Missile Command).
- ❖ Architectural survey of structures in or near Highway 431 relocation alternatives in Eufaula, Alabama, including portions of the Seth Lore/Irwinton Historic District. Areas of potential impact included cemeteries,

structures potentially eligible for the National Register, and structures already listed on the National Register of Historic Places. (Almon Associates).

- ❖ Survey of 2,600 properties dating to World War II on Mainside, Marine Corps Base, Camp Lejeune and New River Marine Corps Air Station, North Carolina. All structures that could be firmly attributed to the period between 1941 and 1946 were inspected in the field. (U. S. Army Corps of Engineers, Wilmington District).

Structures determined to be eligible for inclusion in the National Register following an architectural assessment survey and that may be adversely impacted by future projects can be successfully mitigated through the Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentation. This process is designed to document structures of local, regional, and national significance. The goals of HABS/HAER documentation are to acquire, preserve, and make accessible a written and graphic record of historically significant properties and to ensure preparation of the documentation in a standard format to facilitate integration into the HABS/HAER Collection at the Library of Congress.

HABS/ HAER



Example of a measured drawing produced during the Level I HABS documentation of the Taylor-Cook House (ca. 1840) near Sylacauga, Alabama. Illustration produced using AutoCAD®.

Large-format photographs and measured drawings supplement the written documentation provided during the HABS/HAER process. Objectively written documents allow the reader to place the structure

CULTURAL
RESOURCE
MANAGEMENT
DOCUMENTS

HISTORIC
PRESERVATION
PLANS (HPP)

under consideration into a general or specific historic context, a physical setting, or an interpretive framework. As a historic resource, the HABS/HAER document provides a comprehensive and complete technological and developmental history of a resource, and reflects the federal government's commitment to document, understand, and preserve the surviving physical structures that represent America's heritage.

Examples of HABS/HAER projects completed by PCI include:

- ❖ Level I HAER investigations on five bridges associated with Alabama's Memorial Bridge System. These bridges, all designed by Herman Howard Houk, were constructed during the late 1920s and early 1930s to improve Alabama's infrastructure. (Alabama Department of Transportation).
- ❖ Level I HAER investigations were completed on the Arthur Holmes Merry Generator House (ca. 1935) and the Silas C. Read Sawmill (ca. 1863-1870), both located in Fort Gordon, Georgia, prior to wetlands restoration. (U. S. Army Corps of Engineers, Savannah District).
- ❖ Level I HABS investigation of the Taylor-Cook House (ca. 1834-1840) prior to its relocation due to road-widening activities. Located north of Sylacauga, Alabama, the Taylor-Cook House was architecturally significant since it represented the vernacular application of the Federal high style to a rural setting. (Alabama Department of Transportation).

PCI personnel are well versed in the application of the regulations, laws, and statutes that govern the direction of cultural resource projects. The knowledge of these regulations is applied to our daily work, and PCI has used this knowledge in the past towards the successful completion of Historic Protection Plans (HPP), Memoranda of Agreement (MOA), and National Register nomination forms.

PCI is experienced in the preparation of HPP and cultural resource management plan documents, particularly for military installations and local governments. Preparation includes updating existing plans and generating original plans. PCI is well versed in the requirements established for various preservation plans, such as *Army Regulation [AR] (Facilities Engineering - Historic Preservation)* and *DoD Instruction 4715.3 Environmental Conservation Program*. PCI staff includes professionals trained in Section 106 regulations to aid in the production of HPP documents.

PCI has prepared several HPP reports to provide guidelines for resource managers at various military installations in compliance with existing federal regulations concerning the management of cultural resources on federally owned or monitored lands. The HPP reports prepared by PCI generally involve outlines of the procedures, legislation, and regulations necessary to manage cultural resources; summaries of natural and cultural settings of the particular installation; and databases of individual cultural resources for the management of information on all previous and future resources identified at the installation. These reports are drafted to be concise and understandable to the contractor personnel.

Examples of HPP studies conducted by PCI personnel:

- ❖ An update of the Historical and Archaeological Resources Protection Plan, Charleston Naval Weapons Station, South Carolina. (U.S. Army Corps of Engineers, Savannah District).
- ❖ An update of the Fort Jackson Military Reservation Cultural Resource Management Plan, Richland County, South Carolina. (U.S. Army Corps of Engineers, Savannah District).
- ❖ Cultural Resources Management Plan for Picatinny Arsenal, Morris County, New Jersey. (U.S. Army Corps of Engineers, New York District).

A Memorandum of Agreement (MOA) is a legal document presenting formalized agreements for resolving adverse affects to a cultural resource, and an evidentiary document of an agency's compliance with Section 106. A MOA is a written agreement between the sponsoring agency (e.g., the USACE, Savannah District), the SHPO, the Advisory Council on Historic Preservation in most instances, and any party who assumes a responsibility for the agreement's actions. MOAs can be suggested or created in an HPP. The archaeologist's role with respect to a MOA is to implement various components of the document, such as production of a data recovery or research plan or performance of requisite mitigation of adverse affects (e.g., data recovery). PCI has been involved in several projects in which MOAs stipulated various products or conformance. We are currently working under two MOAs for projects in the State of Mississippi. Involving the excavation of a multi-component prehistoric site and a steamboat, the first MOA involves the Advisory Council, the Mississippi SHPO, and the Mississippi Department of

MEMORANDUM OF
AGREEMENT
(MOA)

PREPARATION OF
NATIONAL REGISTER
NOMINATIONS

Transportation. The second MOA involves the Advisory Council, the USACE, Vicksburg District, and the Mississippi SHPO. PCI also has conducted a project recently for the USACE, New York District, to provide planning information for the implementation of a MOA involving the mitigation of seven historic sailing vessels.

Although many archaeological sites have been assessed as to potential eligibility for inclusion in the National Register of Historic Places, in practice the actual completion and submission of these nominations are the exception rather than the rule. Thorough and professional National Register form completion requires specialized skill and understanding to assimilate and present pertinent site data and conclusions within the framework of National Register criteria. PCI's personnel have proven experience in the completion of National Register nomination forms for prehistoric and historic sites, historic structures, and shipwrecks.

Examples of maritime National Register assessment and mitigation include an underwater survey of eight shipwrecks in the near shore sand placement along the Atlantic Coast of New Jersey. One shipwreck was nominated to the National Register and is currently undergoing mitigation.

Examples of NRHP nomination forms completed by PCI:

- ❖ Mapping of the Tabby Ruin Site (38BU1431) at Laurel Bay Housing Area, Beaufort Marine Corps Air Station, Beaufort, South Carolina. PCI performed intensive mapping of the Laurel Bay Tabby Ruins and completed a NRHP form. The Tabby Ruins were listed on the NRHP in the Spring of 1997. (U.S. Army Corps of Engineers, Savannah District).
- ❖ Archaeological Investigations at the Aklis Site, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands. Following intensive site testing (mitigation) of portions of the Aklis Site, St. Croix, U.S. Virgin Islands, and after a request by the NPS, PCI completed an update of the existing NRHP form. This updated nomination form was completed following a refinement of the ceramic chronology and the excavation of additional features.
- ❖ National Register Assessment of Four Great Lake Shipwrecks, Lake Superior, Minnesota. As components of two investigations conducted for the Minnesota Historical Society, PCI completed NRHP forms for four Great Lake shipwrecks (the Essex, Hesper, Amboy, and George Spencer) located in Lake Superior, Minnesota.

Panamerican Consultants is able to utilize, both through in-house specialists and through consultants, a number of specialized services to serve the needs of our clients. These include, but are not limited to, the use of global positioning systems with sub-meter accuracy (GPS), geographic information systems (GIS), hazardous, toxic, or radioactive waste site trained personnel (HTRW), and special studies such as ¹⁴C, luminescence, or archaeomagnetic dating along with full floral and faunal analysis.

SPECIALIZED SERVICES

Upon request, PCI can provide sub-meter location accuracy employing Trimble Pro XL and Motorola LGT 1000 Differential Global Positioning Systems (DGPS) with data dump capabilities. The company's DGPS platforms provide downloading formats compatible with the government's requirements for Drawing Exchange Format (DXF). The DGPS can be processed in a number of formats, including GIS, which is beneficial to clients with this capability and for PCI's own research applications.

GLOBAL POSITIONING SYSTEM

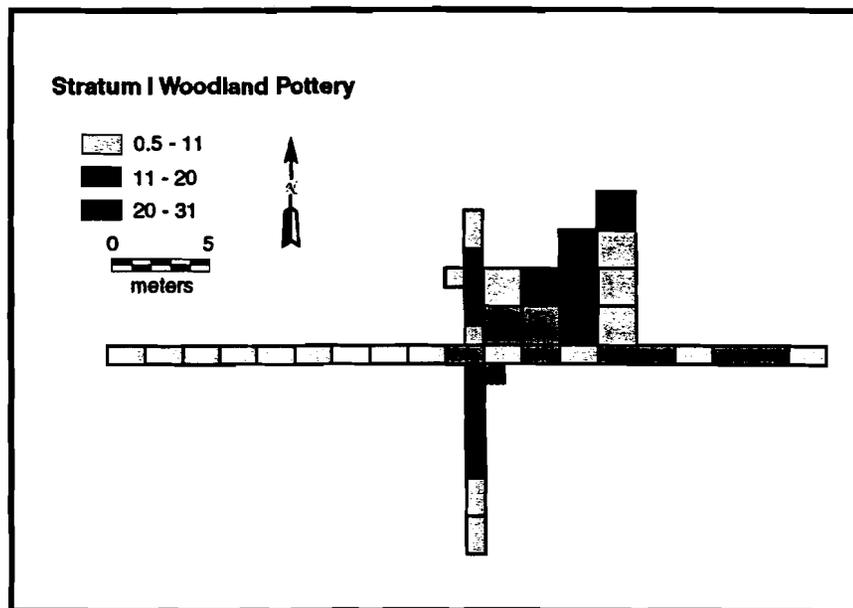
While the actual applications of GIS have historically been fairly limited in Southeastern cultural resource investigations, PCI has successfully integrated GIS applications into various project analyses and continues to develop and refine these capabilities. For example, GIS is particularly suited for studies concerning issues of site distributions in respect to landscapes or horizontal and vertical distributions of cultural material across sites. When provided the appropriate databases and digital imagery, GIS can provide at a glance detailed information regarding site locations in respect to geology, topography, hydrology, and other features of the biophysical environment. In addition to these examples, GIS is an effective tool for land use management. Consequently, the utilization of GIS in CRM projects enhances the analyses of both archaeologists and historians while providing clients with layers of archaeological (and sometimes environmental) data, which constitute an invaluable product for use in land use planning, conservation, and development.

GEOGRAPHIC INFORMATION SYSTEM

PCI has successfully integrated GIS applications into various project analyses and continues to develop and refine these capabilities. PCI utilizes an in-house AutoCAD® platform and DGPS downlink software to generate digital images and databases that can be transferred into the company's ArcView® and ArcCAD® GIS

Figure 6. GIS map showing distribution of Late Woodland West Jefferson phase pottery recovered during the Phase III mitigation of Site 1WA128, Walker County, Alabama. The map was produced using AutoCAD®, ArcView®, and Adobe Illustrator®.

software applications. In turn, these data can be exported in a variety of formats to meet the needs of almost any institution or agency equipped with CAD and/or GIS software including ArcInfo® and Microstation®.



Specific examples of GIS applications performed by PCI:

- ❖ Cultural Resources Remote-Sensing Survey of the Navigation Channel within Pools 3, 4, and 5 of the Red River Waterway, Louisiana. Survey results were produced as a major GIS product. The GIS product included layering of historic channel migrations, known adjacent archaeological sites, the current navigable channel area, remote-sensing survey track lines, contour maps of magnetic data, and identified anomalies. (U.S. Army Corps of Engineers, Vicksburg District).
- ❖ Phase III Mitigation of Site 1WA128, Walker County, Alabama. This GIS application consisted of the spatial analysis of cultural material recovered during a Phase III mitigation of Site 1WA128. In this example, GIS software was used to map various artifact densities across the site and isolate areas of particularly dense concentrations. The GIS study was used in conjunction with numerical analyses produced using Excel and SPSS software. (Drummond Company, Birmingham).

**HAZARDOUS, TOXIC,
OR RADIOACTIVE
WASTE SITES
(HTRW)**

Occasionally, archaeological sites are located in areas that have been identified as hazardous, toxic, or radioactive waste (HTRW) sites. A number of our professional staff and members of our permanent technical staff are trained in the investigation of HTRW sites. PCI has successfully completed several projects in such areas.

It is recognized that a variety of special studies may be required in the performance of individual delivery orders. PCI either offers the in-house staff capabilities to conduct various special studies, or has existing arrangements with qualified consultants who specialize and/or have experience in the region of the solicitation, such as those examples listed below. Specific consultants hired, however, will depend on the location and requirements of each individual delivery order.

Examples of special studies utilized by PCI include:

❖ **Radiocarbon Dating.** PCI has collected and has had processed numerous radiocarbon samples (e.g., bone, charcoal, shell, and wood) from sites in the continental United States and the Caribbean.

❖ **Accelerator ¹⁴C Dating.** A special application of radiocarbon dating, accelerator is critical when only very small samples of datable material are available, or when samples must be derived from artifacts or specimens that must be preserved.

❖ **Luminescence Dating.** Although not widely used in the Southeast, luminescence dating offers an alternative when radiocarbon datable materials are unavailable.

❖ **Archeomagnetic Dating.** Along with luminescence and radiocarbon dating, archeomagnetic dating provides a viable dating alternative. This method provides context dates and is a promising dating method suitable when carbonized material is lacking.

❖ **Oxidizable Carbon Ratio Dating (OCR).** This new procedure provides an independent analysis of age for charcoal found in soil, and is based on the chemical analysis of charcoal within definable environmental contexts.

❖ **Pollen Analysis.** When conducted on on-site and off-site samples, the benefits of this type of analysis include an understanding of the vegetation history of a locality.

❖ **Floral Analysis.** Flotation samples are inventoried and processed either directly in the field or at our laboratory facilities. The recovered material is then transmitted to botanical consultants for identification and analysis of an appropriate sample.

❖ **Faunal Analysis.** PCI staff archaeologist Jennifer Grover is trained in the identification, cataloging, curation, and analysis of faunal remains recovered from archaeological contexts.

❖ **Geomorphological Studies.** Geomorphological studies are intended to provide a range of environmentally related data regarding study areas in general or specific site settings. These studies include soil analysis, palynological interpretations, reconstruction of paleoenvironments, historic river channel migrations, and deep-testing strategies to determine the presence or absence of deeply buried cultural deposits or materials.

PERSONNEL

Professional personnel at Panamerican Consultants, Inc., include 21 qualified archaeologists with specialties in prehistoric and historic archaeology, four maritime archaeologists, a laboratory director, an architectural historian, and an historian. PCI employs over 15 permanent field and laboratory personnel plus a temporary staff to help meet contract needs. PCI's support staff includes three editorial/report/production coordinators, five draftspersons, one darkroom technician/photographer, and six clerical and administrative personnel. In addition, PCI retains a staff of 60 experienced and professional support personnel for field, laboratory, and report publication requirements. Permanent personnel include laboratory technicians, field assistants, crew chiefs, photographers, draftspersons, editors, secretaries, and administrative assistants. Along with our permanent staff, PCI draws on the services of consultants to fulfill any specialized analysis needs. Vitae for the following are available upon request.

PRESIDENT

Mr. Tim S. Mistovich, director of the Tuscaloosa office, has over 20 years of experience in all phases of terrestrial archaeological endeavors, as well as extensive experience in maritime archaeology, both prehistoric and historic. Mr. Mistovich holds bachelor's and master's degrees in anthropology from the University of Alabama, where he also spent 10 years as Staff Archaeologist, then Senior Research Archaeologist, before forming PCI in 1989. Mr. Mistovich has conducted archaeological investigations throughout the southeastern United States and the Caribbean. These projects range from large-scale surveys to site testing and full-scale mitigation conducted for local, state, and federal agencies.

SECRETARY/ TREASURER

Mr. Stephen R. James, Jr., director of the Memphis office, holds a bachelor's degree in anthropology from Memphis State University and a master's degree in nautical archaeology from Texas A&M University. With over 10 years of archaeological experience, Mr. James has directed projects throughout the United States and the Caribbean. While his primary interest is maritime archaeology, he is also fully qualified in terrestrial investigation. Mr. James is accredited by the Society of Professional Archaeologists (SOPA) in Field Research, Collections Research, Historical Archaeology, and Underwater Archaeology. His experience includes work for the U.S. Army Corps of Engineers (Vicksburg, Seattle, Long Beach, New York, Mobile, Wilmington, and Galveston Districts) and also various

public agencies and corporations along the Gulf Coast of the United States and in the Virgin Islands.

Dr. Michael A. Cinquino, director of the New York office, received Ph.D. and M.A. degrees in anthropology from the State University of New York at Stony Brook and a B.A. in sociology (concentration in anthropology) from St. John Fisher College. He has over 20 years of experience in archaeological investigations and cultural resource regulatory review. Dr. Cinquino is certified by the SOPA in Field Research and Archaeological Resource Management. Dr. Cinquino has extensive experience in the eastern United States and the Caribbean conducting archaeological field surveys and archival research, preparation and implementation of predictive models, report writing, NRHP evaluation and forms preparation, preparation of environmental assessments and impact statements, cultural resource management plans, and preparation of technical proposals. He served as State Archaeologist and Review and Compliance Archaeologist for the Puerto Rican State Historic Preservation Office and as a consultant for the New York State Department of Environmental Conservation, serving as director of the cultural resource review for the statewide Uniform Procedures Permit program.

Dr. Michele Hayward holds Ph.D. and M.A. degrees in anthropology from Pennsylvania State University and a B.A. from Beloit College. She has over 20 years of experience in archaeological research within academic, private, and state agency realms. Dr. Hayward has experience in all levels of archaeological investigations including reconnaissance and intensive surveys, data recovery excavation of prehistoric and historic sites, archival research, historic and prehistoric data analysis and report preparation, laboratory director and analysis, and proposal writing and designing archaeological field strategies.

Mr. Paul Jones, director of the Florida office, is completing his Ph.D. in anthropology from the University of Florida, Gainesville, where he also received his master's and bachelor's degrees in anthropology. Mr. Jones is a SOPA-certified archaeologist and member of the Florida Archaeological Council with extensive cultural resource management and academic experience in Florida coastal and interior archaeology. Mr. Jones also has extensive archaeological management and supervisory experience from his

VICE-PRESIDENT

SENIOR
ARCHAEOLOGISTS

work as Director of the University of Alabama, Moundville Archaeological Park, as Vice-President of Southeastern Archaeological Research, Inc., and as principal investigator on numerous CRM projects in Florida. In addition to these skills, Mr. Jones recently completed a Section 106 training course, jointly sponsored by the Advisory Council on Historic Preservation and the University of Nevada, Reno, focusing on the policies and requirements of historic preservation law, legislation, regulations, and guidelines for federal projects.

Dr. Frank Schieppati holds Ph.D., M.A., and B.A. degrees in anthropology from the State University of New York at Buffalo. Dr. Schieppati has 20 years of experience in cultural resources management and has authored over 60 reports for various federal and state agencies, municipalities and utilities throughout New York State, as well as engineering firms and other private organizations. As Director of Environmental Services for the City of Niagara Falls, Dr. Schieppati directed environmental professionals charged with the oversight of all environmental issues where the city had interest of regulatory authority. As Senior Environmental Analyst, NYS DEC, Region 9, Buffalo, his responsibilities included serving as project manager for interdisciplinary reviews of environmental permit applications. As Cultural Resources Environmental Specialist, NYS-DEC, Central Office, Albany, his primary responsibilities included the review and oversight of the cultural resources management aspects of the USEPA's construction grants program.

Mr. Paul Jackson earned bachelor's and master's degrees in anthropology at the University of Alabama. Prior to working with PCI, Mr. Jackson was with the Office of Archaeological Research and the Museum of Natural History at the University of Alabama. Mr. Jackson has served as principal investigator and/or field director for all phases of archaeological investigations in Alabama and Georgia. In addition to his experience supervising and managing numerous field projects, Mr. Jackson has a special focus on lithic technology and the Late Woodland period in the Southeast.

STAFF
ARCHAEOLOGISTS

Mr. Eric Albertson received a master's degree in anthropology from the University of Memphis. During the past five years, Mr. Albertson has participated in cultural resource management projects throughout

the southeastern United States for a variety of state and federal agencies. Mr. Albertson's research interests center around prehistoric occupations within the Mid-South region of the United States.

Mr. James N. Ambrosino earned a bachelor's degree in statistics from the University of Delaware and a master's degree in anthropology from the University of Iowa. He is currently a Ph.D. candidate in anthropology at Southern Methodist University where he is completing his dissertation on warfare and destruction in the archaeological record of the Maya site of Yaxuna, Yucatan, Mexico. Mr. Ambrosino has over 10 years experience in archaeology in both academic and contract capacities, where he has worked extensively in the Midwest, Southwest, and Southeast U.S. as well as Mexico. Since joining PCI, he has worked on numerous projects, covering all phases of investigation, throughout Alabama, Georgia, South Carolina, and Tennessee. Mr. Ambrosino possesses extensive computer skills and has acted as statistical consultant on a number of projects. He has also developed skills in ceramic analysis, iconographic analysis, and hieroglyphic decipherment.

Mr. Andrew Buchner earned a bachelor's degree from Westminster College and a master's degree from Memphis State University, both in anthropology. He has nine years of professional experience in Southeastern archaeology and is primarily interested in the aboriginal occupations of the central and lower Mississippi Valley. Mr. Buchner has participated in over 50 projects within the United States and the Caribbean, covering all phases of investigation.

Ms. Elizabeth Burt received a B.A. from State University of New York, Brockport, and an M.A. degree from State University of New York at Stony Brook. She has over 16 years of combined prehistoric and historic archaeological experience, including supervisory positions in the various phases of cultural resource management throughout the northeastern United States and Puerto Rico. She has proficiency in conducting reconnaissance and intensive cultural resource investigations, laboratory analysis, and report writing and preparation. Before joining PCI, Ms. Burt was an archaeologist with the Archaeology Unit of the New York State Bureau of Historic Sites where she was involved in research, laboratory, and field work, as well as report writing. She has expertise at artifact analysis of prehistoric and historic cultures of the northeastern United States.

Mr. Shawn Chapman holds bachelor's and master's degrees in anthropology from Memphis State University. He has 13 years of experience in cultural resource management studies within the Mid-South and Northeastern regions of the United States. Mr. Chapman also provides expertise in drafting and report preparation as well as laboratory analysis and management. His main area of interest is the prehistory of the lower Mississippi Valley, and an area of specific interest is the development and change of ceramic technology and replication studies. Mr. Chapman has served as principal investigator and/or field director on a number of large-scale cultural resource surveys in Tennessee, Georgia, and Mississippi.

Ms. Jennifer Grover holds a master's degree in anthropology from the University of Alabama and a bachelor's degree in anthropology and classical archaeology from McGill University. Ms. Grover has conducted intensive field investigations in South Carolina, Georgia, and Florida. She served as project manager for PCI's multi-year, indefinite-delivery contract with the U. S. Army Corps of Engineers, Savannah District. In addition to her experience supervising and managing field projects, Ms. Grover is skilled in faunal analysis.

Mr. Robert Hanley holds a master's degree in anthropology from the State University of New York at Albany and earned his bachelor's degree from the State University College at Buffalo. He has nine years background in archaeology and has conducted various field investigations in the Northeast. His responsibilities included supervision of field investigations, crew management, landowner relations, artifact analysis and report preparation. He has comprehensive experience in lithic analysis and human bone analysis.

Mr. Andrew Saatkamp holds bachelor's and master's degrees in anthropology from the University of Tennessee and the University of Memphis, respectively. Mr. Saatkamp has served as project director, field director, and assistant field director on numerous projects in the Southeast. In addition to his experience in directing Phase I and Phase II levels of archaeological investigations, Mr. Saatkamp possesses various ancillary and computer skills, including GIS manipulation and analysis.

Mr. James Duff has over 20 years of extensive professional experience in underwater cultural resource work. Mr. Duff spent five years working for the North Carolina State Underwater Archaeology Unit and participated in remote sensing surveys and anomaly investigations on projects with various universities and consulting firms. Mr. Duff participated in various field, research, and report preparation projects concerning the wreck of the U.S.S. *Monitor* and the Monitor Marine Sanctuary administered by the National Oceanographic and Atmospheric Administration. While in the nautical archaeology master's program at Texas A&M University, Mr. Duff worked on a number of major projects in the United States and the Caribbean. Additionally, Mr. Duff gained considerable experience in the field research and laboratory procedures with the Texas A&M Oceanography Department, which conducted offshore survey projects throughout the Gulf of Mexico, as well as in the Caribbean and West Africa. Following his tenure at Texas A&M, Mr. Duff was an underwater archaeologist for the State of Maryland's Maritime Archaeology Program, where he conducted archival and literature research, performed remote sensing surveys, and had the primary responsibility for Section 106 permit application reviews and recommendations.

Mr. Michael C. Tuttle holds an M.A. in Maritime History from the University of Maine, an M.Litt. in maritime studies from St. Andrews University, Scotland, and a B.A. in history from the University of Buffalo. He has extensive experience in maritime archaeology, primarily on southern and New England coastal rivers, as well as historic wreck sites in Scotland, the Netherlands, and the Channel Islands. Since joining Panamerican in May of 1995, Mr. Tuttle has participated in the U.S.S. *Eastport* and *Dix* excavation, two Civil War vessels, and directed a large, intensive remote sensing project off Long Island, New York, for the New York District. Currently he is directing the remote sensing survey of Pools 3,4, & 5 of the Red River for the Vicksburg District, a magnetometer and sidescan sonar survey of over 600 line miles, a huge remote sensing project which is now in the Draft Report stage. He was also recently the Principal Investigator of a magnetometer and sidescan sonar survey, as well as subsequent diver investigation of two areas in Lake Huron for the Michigan Department of Parks and Recreation.

MARITIME ARCHAEOLOGISTS

Mr. Michael Krivor has become an integral part of our submerged cultural resources unit. Since joining Panamerican, he has participated in numerous remote sensing and diving investigations. With a complete command of our positioning equipment, sidescan sonar and magnetometer, he has acted as the Remote Sensing Specialist on the Red River Pools 3,4, & 5 remote sensing survey, on the past Lake Huron surveys, and, most recently on the Port Ingleside, Corpus Christi Project conducted for the USACE Galveston District under subcontract to Coastal Environments. Mr. Krivor has also taken on the role of Principal Investigator, directing a remote sensing investigation in Charlotte Amalie Harbor, St. Thomas, and the recent archival research and analysis of shipwrecks in an EPA disposal site off New York. An accomplished diver, Mr. Krivor is ABT in the master's program at East Carolina University in maritime history and nautical archaeology. He is set to defend his Master's Thesis this June, which deals with eighteenth century English collier construction and evolution, a vessel type employed by both England and Spain, and represented by the Nuevo Constante wreck.

LABORATORY
DIRECTOR

Mr. Keith Little holds bachelor's degrees in anthropology and geology from the University of Alabama. Mr. Little held numerous supervisory roles in the field and laboratory prior to joining PCI, and has an extensive publication list. For PCI, Mr. Little directs the laboratory and oversees all aspects of report production. He is experienced in all areas of prehistoric and historic artifact analysis, treatment, and curation. Mr. Little also has extensive computer experience, managing all data entry and analysis, and GIS studies for PCI projects.

ARCHITECTURAL
HISTORIAN

Ms. Kelly Nolte holds a B.A. from the University of West Florida and an M.A. from Old Dominion University, both in architectural history. She has spent almost 20 years in the museum profession designing educational programs and completing research and writing about American architecture and architects. Her research on historic structures has been national in scope and has included residences, exhibition buildings, industrial structures, and religious and public service edifices, as well as the architects who built them. Ms. Nolte has placed structures on the National Register of Historic Places and has worked with two museums on the reconstruction of historic buildings. For PCI, Ms. Nolte has performed HABS documentation of domestic and military structures and architectural and structural

inventories of historic communities, military installations, industrial sites, and municipalities.

Mr. Mark Steinback holds a master's degree in local and regional history and a bachelor's degree in European history from the State University of New York at Albany. Mr. Steinback has served as historian for a number of cultural resource management projects in New York. Recent PCI projects to which Mr. Steinback has contributed include Phase I and II investigations at Griffiss Air Force Base, New York, for Tetra Tech, Inc., and historical research for PCI's service contract with the U. S. Army Corps of Engineers, New York District

HISTORIAN

RESEARCH
CONDUCTED
1989-1998

1998

The following is a list of projects conducted by PCI for the past ten years.

A Phase I Architectural Survey of the Proposed County Road 52 Expansion from Tabernacle to Slocomb, Project STPAA-260(14), Houston and Geneva Counties, Alabama. Alabama Department of Transportation (ALDOT). 91C-HWY-203.

Phase I Underwater Archaeological Survey, Sacramento River, Sacramento, California. EIP Associates. 98535.

Haer Documentation: Saratoga Gas Holder No. 2. Niagara Mohawk Power Corporation. 98537.

Historic Cemetery Evaluation for NMGAS Project. Niagara Mohawk Power Corporation. 98538.

Remote Sensing and Diver Investigation of Targets for the Proposed Marina and Harbor Development, Yacht Haven, Charlotte Amalie, St. Thomas, United States Virgin Islands. Dames & Moore. 98540.

Phase II Evaluations of Four Sites, Jefferson County, Alabama. F.W. Dougherty Engineering. 98518.

A Phase III Mitigation of Site 1JE546, Jefferson County, Alabama. F.W. Dougherty Engineering. 98532.

Archaeological Investigations Along and Below Ditch 9, Near Lake City, Craighead County, Arkansas: 1983 and 1998 Results. United States Army Corps of Engineers (USACE), Memphis District. DACW66-97-D-0006.

Five Sites Mitigation, Missouri. USACE, Memphis District. DACW66-97-D-0006.

Archaeological Survey Requirements, Fort Campbell, Kentucky: Christian, Trigg Counties (Kentucky), Montgomery, Stewart Counties (Tennessee). National Park Service (NPS), Southeast Region. 1443CX509097016.

A Phase I Cultural Resources Investigation at the Herkimer Home, Danube Township, Herkimer County, New York. New York State Office of Parks. 98520.

A Phase IB Cultural Resources Survey of the Denis Bay Plantation (Archaeological Site Number 12VAm3-71 and NRHP Number 81000095), St. John, United States Virgin Islands. Speer & Milne Architecture. 98513.

1998 CONTINUED

Phase I Cultural Resources Survey of 24 Riser Pipe and Access Road Locations, Calhoun, Chickasaw, and Webster Counties, Mississippi. USACE, Vicksburg District. DACW38-98-R-0005.

Remote Sensing and Diver Investigation of the Ann E. Abramson Marine Facility, Frederikstad Pier, St. Croix, United States Virgin Islands. Virgin Islands USA. 98517.

West Point HABS (Inventory). Barry A Vittor & Associates. DACW51-97-D-0009.

Green Brook Sub-Basin (Upper & Middle) Flood Control Project. Barry A Vittor & Associates. DACW51-97-D-0009.

Compilation of Four Shipwreck Recordations and Development of a Public Outreach Program for the Atlantic Coast of New Jersey Cultural Resource Monitoring Program. Barry A Vittor & Associates. DACW51-95-D-0009.

Phase I Archaeological Survey of Inholdings in the Overhills Track, Harnett and Cumberland Counties, North Carolina. Gulf South Research Corporation and US Army Corps of Engineers (USACE), Savannah District. DACW21-95-D-0007.

1997

Phase I Cultural Resource Survey of 7,245 Acres, J. Strom Thurmond Lake and Dam, Columbia and McDuffie Counties, Georgia. Gulf South Research Corporation and USACE, Savannah District. DACW21-95-D-0007.

Cultural Resources Investigations at Fort Hamilton, Kings County, New York. USACE, New York District and Barry A. Vittor and Associates, Inc. DACW51-97-D-0009.

Feature Excavations at Sites 3MS599, 3MS600, and 3MS601, Ditch 1 Item 4, Mississippi County, Arkansas. USACE, Memphis District. DACW66-96-D-0036.

Phase I Cultural Resources Survey of 5,180 Acres within Training Area 17, Fort Campbell, Kentucky and Tennessee. National Park Service (NPS), Southeast Region. 1443CX509097016.

1997 CONTINUED

Data Recovery at Site LO-9, Municipio de Loiza, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

Cultural Resources Investigations, Morris Canal Right-of-Way, Joseph G. Minish Passaic River Waterfront Park and Historic Area, Newark, Essex County, New Jersey. USACE, New York District and Northern Ecological Associates, Inc. DACW51-97-D-0010.

Cultural Resource Survey of 2,171 Acres in Compartments D and F, Fort Benning Military Reservation, Alabama. NPS, Southeast Region. 1443IB500093005.

Phase II Testing of a Portion of Site 38BU927, Marine Corps Air Station, Beaufort, South Carolina. Gulf South Research Corporation and the USACE, Savannah District. DACW21-95-D-0007.

Phase I Intensive Archaeological Survey, 3-D Seismic Testing Lines, Jones and Wayne Counties, Mississippi. CGG Land Seismic. Job #4855.

Intensive Archaeological Survey of the Stokes Creek Project, Dyer County, Tennessee. USACE, Memphis District. DACW66-96-D-0036.

Update of Architectural Assessment of the World War II Military and Civilian Works, U.S. Army Missile Command, Redstone Arsenal, Alabama. Redstone Arsenal, Base Operations Branch. DAAH03-97-P-1077.

Phase II Testing of Historic Cemetery Site 40WM208, 840 Highway Corridor, Williamson County, Tennessee. Gresham, Smith and Partners and the TDOT. 94840-1203-04.

Cultural Resources and Archaeological Surveys, Picatinny Arsenal, Morris County, New Jersey. USACE, New York District and Northern Ecological Associates, Inc. DACW51-97-D-0010.

Cultural Resources Remote Sensing Survey of 13 Oxbow Access Channels within the Red River Waterway, Louisiana. USACE, Vicksburg District. DACW38-98-P-0045.

Historical and Archaeological Resources Protection Plan, Marine Corps Air Station, Beaufort, South Carolina. Gulf South Research Corporation and the USACE, Savannah District. DACW21-95-D-0007.

Phase II Evaluation, Briggs Dairy Barn and Milk House, Jefferson County, Alabama. Alabama Department of Transportation (ALDOT). 91C-HWY-203.

Cultural Resource Survey, Long Creek Watershed, Mississippi. Natural Resources Conservation Service. 53-4423-6-3944.

Phase III Mitigation of Site 1WA128, Walker County, Alabama. Drummond Company, Birmingham. 5199-337173.

Cultural Resource Survey for the Proposed National Fuel Line K 20" Pipeline Replacement, Erie County, New York. Northern Ecological Associates, Inc. 97450.

Cultural Resource Survey, Channels 9 and 10, Palmers Crossing, Mississippi. Natural Resources Conservation Service. 53-4423-6-3944.

Cultural Resource Survey, Shreveport to Memphis Fiber Optic Corridor. Finley Engineering Company, Inc. 97457.

Archeological Site Testing and Evaluation of Selected Sites III, Fort Benning Military Reservation, Alabama. NPS, Southeast Region. 1443IB500093005.

Phase II Investigations at Selected Sites, Marine Corps Recruit Depot, Parris Island, South Carolina. Gulf South Research Corporation and the USACE, Savannah District. DACW21-95-D-0007.

Phase II Testing and Evaluation of Site 1JE526, Jefferson County, Alabama. Department of Community Development, Birmingham. P29542.

Phase II Evaluation of Site 1Mr189, Marion County, Alabama. Perc Engineering Co., Inc. 97452.

Phase II Documentation of Elyton Village, Birmingham, Alabama. The Housing Authority of the Birmingham District. 970096.

Definition of Picatinny Arsenal Historic Districts, Picatinny, New Jersey. USACE, New York District. DACW51-95-D-0024.

Phase III Data Recovery at 1MR166, Marion County, Alabama. ALDOT. 91C-HWY-203.

Phase IB Cultural Resources Survey of the Proposed Subdivision on Lovango Cay, U.S. Virgin Islands. Estate Lovango Limited.

Data Recovery at Sites 3MS599, 3MS600, and 3MS601, Ditch 1, Item 4, Mississippi County, Arkansas. USACE, Memphis District. DACW66-96-D-0036.

Cultural Resources Evaluation and Remote Sensing for the Archaeological Investigation of a Possible Watercraft, River Mile 149.2, Pool 3, Red River Waterway, Natchitoches Parish, Louisiana. USACE, Vicksburg District. DACW38-96-D-0007.

Phase I Cultural Resource Investigations of the Hamilton Mounds and Andrew Jackson Military Trail, Marion County, Alabama. Hankins Engineering, Inc.

Cultural Resource Investigations for the Joseph G. Minish Passaic River Waterfront Park and Historic Area, Newark, Essex County, New Jersey. Northern Ecological Associates, Inc. DACW51-97-D-0010.

Cultural Resource Survey, Rio Loco Flood Control Project, Guanica, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

Archaeological Survey of the Proposed Next Generation Weather Radar Site, Montague, New York. SRI International. 27-000037.

Remote Sensing Survey, Near Shore Project Area, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York. USACE, New York District. DACW51-95-D-0024.

Cultural Resource Survey for the Proposed Long Pond-North Stillwell Timber Harvest, U.S. Military Academy, West Point, Orange County, New York. Barry A. Vittor and Associates, Inc. DACW51-97-D-0009.

Data Recovery at Sites 23MI606, 734, 735, 736, 783, 784, and 786, Mississippi County, Missouri. USACE, Memphis District. DACW66-96-D-0036.

Archeological Site Testing and Evaluation of Selected Sites II, Fort Benning Military Reservation, Alabama. NPS, Southeast Region. 1443IB500093005.

Phase IB Cultural Resource Survey of an 83 Acre Subdivision Site in Greece, Monroe County, New York. Tra-Mac Associates, Inc.

Phase III Data Recovery at 1MR165, Marion County, Alabama. ALDOT. 91C-HWY-203.

Cultural Resource Phase I Investigation at Picatinny Arsenal, Union and Somerset Counties, New Jersey. Northern Ecological Associates, Inc. DACW51-97-D-0010.

Intensive Archaeological Survey, Both Sides of the South Fork, Forked Deer River, Haywood County, Tennessee. USACE, Memphis District. DACW66-96-D-0036.

Phase III Mitigation of Site 1WA129, Walker County, Alabama. Drummond Company, Birmingham. 5199-334887.

Phase II Investigation of East Caddo Site, Webster Parish, Louisiana. Headington Oil Company, Lafayette.

Cultural Resources Assessment and Remote Sensing for Revetment Construction at Four Locations, Red River Emergency Bank Protection, Great Bend Region, Arkansas. USACE, Vicksburg District. DACW38-96-D-0007.

Phase III Data Recovery at 1MR160, Marion County, Alabama. ALDOT. 91C-HWY-203.

Archaeological Mitigation of Hut Site #6, Stony Lonesome II Housing Facility, U.S. Military Academy, West Point, Orange County, New York. USACE, New York District. DACW51-95-D-0024.

Phase II Archaeological Investigation and National Register Eligibility Evaluation of Site PCI #3, Griffis Air Force Base, New York. Tetra Tech, Inc. F33615-90-D-4006.

Cultural Resource Survey, Rio Ojo de Agua, Aguadilla, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

Archaeological Survey, St. James Ditch, St. John's Bayou, Mississippi County, Missouri. USACE, Memphis District. DACW66-96-D-0036.

Evaluation of Bridges and Flood Proofing/Buy Out Structures, Green Brook Flood Control Project, Middlesex, Union, and Somerset

1997 CONTINUED

Counties, New Jersey. USACE, New York District. DACW51-95-D-0024.

Phase IA Cultural Resources Survey of the Christiansted Boardwalk Project, St. Croix, U.S. Virgin Islands. Jaredian Design Group, St. Thomas.

Archeological Testing and Evaluation of Selected Sites I, Fort Benning Military Reservation, Alabama. NPS, Southeast Region. 1443IB500093005.

Site Testing/Mitigation for Two Archaeological Sites at Stony Lonesome One-Stop Shopping Center, U.S. Military Academy, West Point, Orange County, New York. USACE, New York District. DACW51-95-D-0024.

Remote Sensing Survey, Brunswick Harbor Deepening Project, Glynn County, Georgia. USACE, Savannah District. DACW21-94-D-0026.

Cultural Resources Assessment and Remote Sensing for Revetment Construction at the Grand Gulf Revetment, Claiborne County, Mississippi River, Mississippi. USACE, Vicksburg District. DACW38-96-D-0007.

Archaeological Investigations Along the Mississippi River Levees, Stovall, Coahoma County, Mississippi. USACE, Memphis District. DACW66-96-D-0036.

1996

Cultural Resource Survey of the Proposed Punta Salinas, Puerto Rico Weather Radar Site. Raytheon, Inc. 248182.

Intensive Archaeological and Architectural History Survey of the U.S. Highway 431 Study Corridor, Eufaula, Alabama. Almon Associates. NHF-300(11).

Phase II Testing of Site 38BU1460, MCAS, Beaufort, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Survey for the Cat Hollow Swamp Timber Harvest, U.S. Military Academy, West Point, Orange County, New York. USACE, New York District. DACW51-95-D-0024.

Phase II Testing of Cultural Resources Associated with Corridor X, Section 35 in Jefferson County, Alabama. ALDOT. 91C-HWY-203.

HABS Documentation of Building 1520, Fort Jackson, South Carolina. USACE, Norfolk District. DACA65-96Q-0128.

Phase I Survey of 8,450 Acres at Thurmond Lake, Georgia and South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Survey for the Proposed Stony Lonesome One-Stop Shopping Center (PX) at USMA, West Point, New York. USACE, New York District. DACW51-95-D-0024.

Phase III Archaeological Investigations at a Portion of the McKnight Site (22CO560), Coahoma County, Mississippi. Mississippi Transportation Commission. 97-0009-04-030-10.

Cultural Resource Survey for Three Alternatives for LPG Pipeline Corridor, Penuelas, Puerto Rico. Foster Wheeler Environmental Corporation. COL-96P-0005.

Phase I Survey of Selected Areas, MCAS, Beaufort, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Management Plan, Rotterdam Housing, Rotterdam, Schenectady County, New York. USACE, New York District. DACW51-95-D-0024.

Phase II Testing of Site 38BU1641, MCAS, Beaufort, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Survey of Selected Areas at Townsend Bombing Range, McIntosh County, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Synthesis Volume, Quiver River, Mississippi Cultural Resources Study. USACE, Vicksburg District. DACW38-91-D-0017.

Cultural Resources Survey of the Durham Landfill Expansion, Durham, North Carolina. Malcolm, Pirnie, Inc., Newport News, Virginia. 0759-029.

Phase I-B Archaeological Investigations for Terrestrial and Underwater Sections of Veterans Drive Improvements, Charlotte Amalie, St. Thomas, U.S. Virgin Islands. Parsons, Brinckerhoff, Quade, and Douglas, Maitland, Florida. DPC-0034(1).

1996 CONTINUED

Intensive Cultural Resources Survey of Within Selected Portions of the Uwharrie National Forest, North Carolina. USDA Forest Service. 43-4550-6-9100.

HAER Documentation of the Bellwood Bridge, Geneva County, Alabama. ALDOT. 91C-HWY-203.

Cultural Resources Survey of Selected Areas at Fort Benning, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Phase I Cultural Resource Survey of the Burns Prospect 3-D Seismic Survey, Bienville National Forest, Smith County, Mississippi. Pitts Oil Company, Dallas, Texas.

Phase II Testing of Three Archaeological Sites Within the Lost Creek Relocation Permit Area. Drummond Company. 5199-332173.

HAER Documentation of the B.B. Comer Bridge, Jackson County, Alabama. ALDOT. 91C-HWY-203.

Cultural Resources Survey and Archaeological Testing, Rio Grande de Arecibo, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

Archival Research/Phase I Archaeological Survey of the Crooked Creek Reservoir Project Area, Jefferson County, Alabama. Malcolm Pirnie, Inc., Newport News, Virginia. 2143-097.

Phase II Testing and Evaluation, Sites 1MA275, 1MA276, and 1MA279, Montgomery Outer Loop, Montgomery County, Alabama. ALDOT. 91C-HWY-203.

Relocate Archaeological Site PE-4, Penuelas, Puerto Rico. Foster Wheeler Environmental, Lyndhurst, New Jersey. POKES-96P-2005.

Cultural Resource Inventory, 1,291 Acres, Compartment B-04, Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005.

HABS Documentation of the Bledsoe-Cook House, Talladega County, Alabama. ALDOT. 91C-HWY-203.

Recordation of Two Shipwreck Sites in the Near Shore Sand Placement Area, Asbury Park to Manasquan, Section II, Atlantic Coast of New Jersey Beach Erosion Control Project. GAI

Consultants, Inc., Monroeville, Pennsylvania for the USACE, New York District. 94-456-16.

1996 CONTINUED

Cultural Resource Investigations along the Navigation Channel of Pools 3, 4, and 5 of the Red River Waterway, Louisiana. USACE, Vicksburg District. DACW38-91-D-0017.

1995

HAER Documentation of the Lambert Transfer Building, Colbert County, Alabama. ALDOT. 91C-HWY-203: DE-0026.

Phase I Cultural Resources Survey of 8,250 Acres at J. Strom Thurmond Lake, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Archaeological Survey of the Seneca Army Airfield, Seneca Army Depot, New York. USACE, New York District. DACW51-95-D-0024.

Cultural Resource Investigations along the Navigation Channel of Pools 3, 4, and 5 of the Red River Waterway, Louisiana. USACE, Vicksburg District. DACW38-91-D-0017.

HAER Documentation of the Lambert Transfer Building, Colbert County, Alabama. ALDOT. 91C-HWY-203: DE-0026.

Phase I Cultural Resources Survey of 8,250 Acres at J. Strom Thurmond Lake, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Underwater Archaeological Investigation and Documentation of Three Anomaly Clusters, Three Segments of Proposed Preferred Corridor for Replacement of Bonner Bridge, Dare County, North Carolina. Parsons, Brinckerhoff, Quade, and Douglas.

Phase II Testing/Phase III Data Recovery, Cane Creek Site, 1CC53, Conecuh County, Alabama. ALDOT. 91C-HWY-203: BRF-492(1).

Historical Architectural Survey of all Buildings on RSA for Determining BRAC Impacts to Cultural Resources. U.S. Army Missile Command, Redstone Arsenal, Alabama. DAAH03-95-P-3133.

Cultural Resources Survey and Archaeological Testing, Rio de la Plata, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

1995 CONTINUED

Phase I Cultural Resources Survey of Selected Areas at Townsend Bombing Range, McIntosh County, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resource Survey, Chicopa Levee in Holmes County, Mississippi. USDA, Soil Conservation Service, Jackson, Mississippi. 53-4423-5-2672.

Cultural Resources Survey, Arthur Kill New York Reach, Richmond County, New York. USACE, New York District. DACW51-95-D-0024.

Phase II Archaeological Testing in the OMMCS Field Training Exercise Area off Hansen Road, Redstone Arsenal. U.S. Army Missile Command, Redstone Arsenal, Alabama. DAAH03-95-P-3131.

Phase II Archaeological Investigations, Griffiss Air Force Base, New York. Tetra Tech, Inc., San Bernardino, California. F33615-90-D-4006:14.

Waynesboro South 3-D Cultural Resource Survey, DeSoto National Forest, Mississippi. Coastal Oil and Gas, Inc., Houston, Texas.

Cultural Resource Investigations at the Loggy Bayou Mitigation Lands, Tract 122, Bossier Parish, Louisiana. USACE, Vicksburg District. DACW38-91-D-0017.

Cultural Resources Survey of Selected Tracts in Cantonment Area, Fort Gordon, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Survey, Arthur Kill, New Jersey Reach, Union and Middlesex Counties, New Jersey. USACE, New York District. DACW51-95-D-0024.

Cultural Resource Survey of Proposed Construction at the Stony Lonesome Housing Facility, U.S. Military Academy, Orange County, New York. USACE, New York District. DACW51-95-D-0024.

Cultural Resources Survey and Archaeological Testing, Rio Anton Ruiz at Humacao, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

Cultural Resources Survey, Kill Van Kull Reach, Staten Island,

Richmond County, New York. USACE, New York District. DACW51-95-D-0024.

Update of Draft Historic and Archeological Resources Protection Plan, Charleston Naval Weapons Station, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Update of the Draft Historic Preservation Plan for Marine Corps Base, Camp Lejeune, North Carolina. USACE, Wilmington District. DACW54-93-D-0032.

Magnetometer and Side Scan Sonar Survey of the Sunflower River, Mississippi. USACE, Vicksburg District. DACW38-91-D-0017.

Cultural Resources Management Plan for Watervliet Arsenal, Albany County, New York. USACE, New York District. DACW51-95-D-0024.

Cultural Resource Survey, Indian Creek, Iuka, Mississippi. USDA, Soil Conservation Service, Jackson, Mississippi. 53-4423-5-2672.

Technical Syntheses and Data Recovery, Fig Island Channel Site, Savannah Harbor, Georgia. USACE, Savannah District. DACW21-94-D-0026.

HAER Documentation of the Underwood Bridge, Greene and Hale Counties, Alabama. ALDOT. BRF-351(12).

Determining Archeological Site Locations Using a Global Positioning System and Phase II Testing of Selected Sites at Fort Gordon, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Management Plan for Fort Hamilton, Kings County, New York. USACE, New York District. DACW 51-95-D-0024.

Phase II Testing of Six Acres in Site 17-3 at MCAS, Beaufort, South Carolina. USACE, Savannah District. DACW 21-93-D-0040.

Cultural Resource Assessment and Magnetometer Survey of Four Revetment Construction Areas Along the Great Bend Region, Arkansas. USACE, Vicksburg District. DACW38-91-D-0017.

Underwater Archaeological Surveys and Determination of Eligibility of Eight Shipwreck Sites in the Near Shore Sand Placement Area,

1995 CONTINUED

Asbury Park to Manasquan, Section II, Atlantic Coast of New Jersey Beach Erosion Control Project. Subcontract to GAI, Inc., Monroeville, Pennsylvania for the USACE, New York District. FP&M 368-94-06G.

Cultural Resource Inventory, 1,458 Acres, Compartments Z-02 and Z-03, Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005.

Cultural Resource Management Plan for the Picatinny Arsenal, Morris County, New Jersey. USACE, New York District. DACW51-95-D-0024.

Cultural Resource Inventory, Timber Thinning Areas, Bayou Bodcau Reservoir, Fiscal Year 1995. USACE, Vicksburg District. DACW38-91-D-0017.

Archaeological Services in Support of Stanley R. Mickelson Safeguard Complex, North Dakota, Cultural Resource Management Plan. Subcontract to Teledyne Brown Engineering, Huntsville, Alabama. U.S. Army Strategic Defense Command. DASG60-92-C-0036.

Cultural/Archeological Survey for the Upper Basin of the Greenbrook Flood Control Project, New Jersey. USACE, New York District. DACW 51-95-D-0024.

Phase IA/B Cultural Resource Survey of a Thirty-One Acre Plot, Estate Peterborg, St. Thomas, U.S.V.I. Arden Development Corporation, St. Thomas.

Cultural Resource Survey of Civil War and Post-Bellum Sites (1862-1892), Marine Corps Recruiting Depot, Parris Island, South Carolina. USACE, Savannah District. DACW 21-93-D-0040.

Historical Assessment, Magnetometer and Terrestrial Survey for Revetment Construction on the Mississippi River, Bolivar County, Mississippi. USACE, Vicksburg District. DACW38-91-D-0017.

Underwater Inspection of Four Shipwrecks, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, Nassau County, New York Storm Reduction Project. USACE, New York District. DACW 51-95-D-0024.

Mainside Architectural Survey, Marine Corps Base, Camp Lejeune,

North Carolina. USACE, Wilmington District.
DACW54-93-D-0032.

Cultural Resource Survey, Spillway Area of Black Creek Watershed,
Holmes County, Mississippi. U.S.D.A. Soil Conservation Service,
Mississippi. 53-4423-5-2672.

Phase IA/B Cultural Resource Survey (Terrestrial and Maritime)
of the Proposed Artisans' Village, Estate Carolina, Coral Bay, St.
John, U.S.V.I. Coral Bay Watersports, St. John.

Cultural Resource Inventory, Sunflower River Basin, Phase VII,
Mississippi. USACE, Vicksburg District. DACW38-91-D-0017.

Natural and Cultural Resources and NEPA Protocol Reviews, Fort
Hood, Texas Environmental Compliance Assessment System.
Subcontract to the Environmental Company, Inc., Charlottesville,
Virginia. Fort Worth District, USACE. DACA63-95-D-0005.

Phase II Testing of 14 Archaeological Sites, Fort Jackson, South
Carolina. USACE, Savannah District. DACW 21-93-D-0040.

Archaeological Survey and Data Recovery at Aklis Archaeological
Site, Sandy Point MWR, St. Croix, U.S.V.I. NPS, Southeast
Regional Office. 1443CX500094025.

Historical Survey and Assessment of Waterborne Commerce and
Transportation and an Inventory of Known Underwater Cultural
Resources on the Sunflower River System. USACE, Vicksburg
District. DACW38-91-D-0017.

Cultural Resource Inventory, 3,231 Acres, Compartments T, Y, and
Z, Fort Benning, Georgia. NPS, Southeast Region.
1443IB500093005.

Cultural Resources Survey of the Rio Guamani Flood Control Study,
Guayama, Puerto Rico. USACE, Jacksonville District.
DACW17-94-D-0010.

Update Fort Jackson Historic Preservation Plan. USACE, Savannah
District. DACW21-93-D-0040.

Investigations Necessary to Further Identify and Evaluate Two
Anomalies in the Fidler Bend-Cottonwood Area, Mississippi.
USACE, Vicksburg District. DACW38-91-D-0017.

1995 CONTINUED

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Historical Assessment and Underwater Evaluation of Anomalies, Tensaw Bridge and the Battleship Causeway, Mobile and Baldwin Counties, Alabama. ALDOT. BRM-7501(8).

Cultural Resource Survey of a Site in the Town of Charlotte, Chautauqua County, New York. Chautauqua County Department of Public Works, New York.

Cultural Resource Survey of 7,286 Acre Timber Harvest Area, Thurmond Lake, Georgia. USACE, Savannah District. DACW 21-93-D-0040.

Recordation to HABS/HAER Standards of the Cedar Creek Bridge, Franklin County, Alabama. Franklin County Highway Department.

Cultural Resource Inventory, Sunflower River (Bogue Phalia), Phase V, Mississippi. USACE, Vicksburg District. DACW38-91-D-0017.

Remote Sensing Survey, Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Island Beach, Nassau County, New York Storm Reduction Project. USACE, New York District. DACW51-95-D-0024.

Phase I Remote Sensing Survey, McKinley Marina Development Project, Milwaukee County, Wisconsin. Milwaukee County Department of Public Works.

Phase II Evaluation and Phase III Data Recovery, Site 1Wa140, Walker County, Alabama. ALDOT. BRM-7501(8).

Cultural Resource Survey, Crawford Creek 3-D Seismic Testing, DeSoto National Forest, Mississippi. Coastal Oil and Gas Corporation, Houston, Texas.

Phase II Identification and Assessment of the U.S.S. Eastport, Red River, Louisiana. Joint-Venture with Coastal Environments, Inc., Baton Rouge, Louisiana. USACE, Vicksburg District.

Cultural Resource Inventory, 1,094 Acres, Compartment O-5, Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005.

HAER Documentation of the Tensaw River Bridge, Mobile and Baldwin Counties, Alabama. ALDOT. BRM-7501(8).

Phase II Testing, Site 22Hi735, Hinds County, Mississippi. Mattiace Properties, Inc., Jackson, Mississippi.

1995 CONTINUED

Historical and Archival Research of Marine Corps Recruit Depot, Parris Island, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resources Survey of the Rio Nigua Flood Control Study, Municipio of Salinas, Puerto Rico. USACE, Jacksonville District. DACW17-94-D-0010.

Phase IA Cultural Resource Investigations, Parcels 2E51-19 and 2E53, Estate Caret Bay, St. Thomas, U.S.V.I. McComb Engineering, P.C., St. Thomas, U.S.V.I.

Archaeological Investigations, Griffiss Air Force Base, New York. Subcontract to Tetra Tech, Inc., San Bernardino, California.

Cultural Resource Assessment, Proposed U.S. Navy Over the Horizon Radar Station, Puerto Rico. Subcontract to TAMS Consultants, Inc., New York. N62470-93-D-4041:004.

Visual Reconnaissance of Thirteen (13) Dams in the Savannah Civil Works District for the Federal Emergency Management Agency. USACE, Savannah District. DACW21-93-D-0040.

Testing and Evaluation of Nine (9) Archaeological Sites Potentially Affected by Raising the Conservation Pool, Falls Lake, Durham, Granville, and Wake Counties, North Carolina. USACE, Wilmington District. DACW54-93-D-0032.

Cultural Resource Inventory, 1,416 Acres, Compartments X-03 and A-14, Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005.

Archival Documentation to HABS at the Venus Point Light. USACE, Savannah District. DACW21-93-D-0040.

Archaeological Data Recovery, Area 4, Phase II Fig Island Channel Site, Savannah Harbor, Georgia (with Gulf Engineers & Consultants, Inc.). USACE, Savannah District. DACW21-92-D-0013:59.

Cultural Resource Inventory of the Archeological and Historical Resources Along Part of Canal 19, Arkansas. USACE, Vicksburg District. DACW38-91-D-0017:19.

Cultural Resources Survey of Cuts 3 and 4, Lower Savannah River Environmental Restoration, Effingham County, Georgia and Jasper

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1994 CONTINUED

County, South Carolina. USACE, Savannah District. DACW21-93-R-0009:003.

Architectural and Photographic Recordation of the Rogers (Parrish) House, Falls Lake, Durham County, North Carolina. USACE, Wilmington District. DACW54-93-D-0032:002.

Cultural Resource Survey of the Palachucola Unit of Webb Wildlife Management Area, South Carolina. USACE, Savannah District. DACW21-93-R-0009:002.

Phase II Archaeological Investigations of the Proposed Site of the Lady Luck Casino, Warren County, Mississippi. Development/Design Consortium, Inc., Memphis, Tennessee.

Remote Sensing Survey and Diver Investigation, Savannah Riverwalk Project, Chatham County, Georgia. USACE, Savannah District. DACW21-94-D-0026.

Phase I Archaeological Reconnaissance Surveys for 21 Bridge Replacement Projects in Tennessee. Neel-Schaffer, Inc., Nashville, Tennessee. 2-2188-28/47.

Cultural Resource Survey of Marine Combat Training Area on Marine Corps Recruit Depot, Parris Island, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Phase I Archaeological Reconnaissance Survey, Covington West Bypass - State Route 439 from U.S. 51 South of Covington to U.S. 51 North of Covington, Tipton County, Tennessee. Parsons De Leuw, Inc., Memphis, Tennessee. 84200-1201-04.

Remote Sensing Survey, Savannah Harbor Operations and Maintenance Project, Chatham County, Georgia. USACE, Savannah District. DACW21-94-D-0026.

Cultural Resource Advance Planning Report, State Route 96 from I-65 to I-24, Williamson and Rutherford Counties, Tennessee. Chester IDE Associates, Nashville, Tennessee.

Cultural Resource Survey and HABS/HAER Documentation for the Maxwell Mill/Dam and Scout (Signal) Mill/Dam, Fort Gordon, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Intensive Cultural Resource Survey, Corridor X, Marion, Jefferson, and Walker Counties, Alabama. ALDOT. APD-471.

Cultural Resources Survey and Phase II Testing, Dare County Ordnance Range and Fort Fisher Recreation Area, Seymour Johnson Air Force Base, North Carolina and Grand Bay Ordnance Range, Moody Air Force Base, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Phase IA/IB Cultural Resource Survey of an Eleven Acre Plot, St. Croix, U.S. Virgin Islands. AT&T Submarine Systems, Inc.

Historic Building Survey of Seymour Johnson AFB, North Carolina. USACE, Savannah District. DACW21-93-D-0040.

Phase I Archaeological Investigations, Proposed State Route 385 from East of Ricks Road to East of Salem Road, Shelby County, Tennessee. Parsons De Leuw, Inc., Memphis, Tennessee.

GPS Site Locating Project for Previously Recorded Sites in the Palachucola Unit of the Webb Wildlife Management Area, Hampton and Jasper Counties, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Archaeological Assessment of the Historic Shelby Furnace Site, Shelby County, Alabama. Shelby County Historical Society and the Alabama Historical Commission.

Conservation and Documentation of Archaeological Materials Recovered from Savannah Harbor, Chatham County, Georgia. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resource Inventory, 700 Acres, Compartment A-9, Fort Benning, Georgia. NPS, Southeast Region. 1443CX500093010:07.

Phase II Testing of the Laural Bay Family Housing Area on the Marine Corps Air Station, Beaufort, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Phase IA Cultural Resource Survey, Estate Tutu, St. Thomas, U.S.V.I. Jaredian Design Group.

Cultural Resource Survey of an 8,000-Acre Timber Harvest Area, Thurmond Lake, Georgia. USACE, Savannah District. DACW21-93-R-0009:001.

Cultural Resources Consulting Services at U.S. Army Kwajalein Atoll. The Earth Technology Corporation. DASG60-92-C-0001.

1994 CONTINUED

Establish Locations of National Register Eligible Sites of the Di-Lane and Spring Lake Tracts by Global Positioning System (GPS), Burke and Screven Counties, Georgia. USACE, Savannah District. DACW21-93-R-0009:001.

Historical Assessment and Magnetometer Survey for Revetment Construction at Three Locations Along the Mississippi River. USACE, Vicksburg District. DACW38-91-D-0017:17.

Cultural Resource Survey, Raphume Hill Bypass, St. Thomas, U.S. Virgin Islands. Parsons, Brinckerhoff, Quade & Douglas, Inc. DPC-0034(1).

Cultural Resource Survey, (FY94) Timber Harvest Areas, Marine Corps Air Station, Beaufort, South Carolina. USACE, Savannah District. DACW21-93-D-0040.

Cultural Resource Survey of the Archeological and Historical Resources at Finn Revetment, Emergency Bank Protection, Hempstead County, Arkansas. USACE, Vicksburg District. DACW38-91-D-0017:18.

Phase IA Cultural Resource Survey, Hotel on the Cay, St. Croix, U.S.V.I. West Indies Resort Corp.

Cultural Resource Inventory, 4,900 Acres at Fort Benning, Georgia. NPS, Southeast Region. 1443CX 500093010:06.

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Cultural Resource Inventory, Timber Thinning Areas, Bayou Bodcau Reservoir FY94. USACE, Vicksburg District. DACW38-91-D-0017:16.

Architectural Inventory at Patuxent Naval Air Station, Maryland (with Ecology and Environment, Inc.). U.S. Navy, Chesapeake Division. CN-8961:6.

Archaeological Survey of Compartment Q-2 (1,079 acres), Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005:05.

Cultural Resource Reconnaissance, Yazoo Delta Project. USACE, Vicksburg District. DACW38-91-D-0017:15.

Archaeological Phase II Evaluation and Testing, Relocation of Alabama Highway 110 from I-85/Mitylene Interchange to Merry, Montgomery County, Alabama. ALDOT. F-391(9).

Historic Preservation Plan: Air National Guard, Puerto Rico and St. Croix, U.S. Virgin Islands. NPS, Philadelphia.

1993 CONTINUED

Archaeological Data Recovery, Area 4, Phase II Fig Island Channel Site, Savannah Harbor, Georgia (with Gulf Engineers & Consultants, Inc.) USACE, Savannah District. DACW21-92-D-0013:59.

Archaeological Survey of Compartment C-3 (1,085 acres), Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005:04.

Cultural Resource Inventories (Terrestrial and Maritime), Proposed Casino Locations, Vicksburg and Clarksdale, Mississippi. Design Development Consortium, Inc.

Archaeological Investigations at Fort Negley, Nashville, Tennessee. Metropolitan Government of Nashville. 10991.

Archaeological Reconnaissance Survey of State Route 6 (U.S. 43) from the Alabama State Line to the Five-Lane Section in Leoma, Lawrence County, Tennessee (with Neel-Schaffer, Inc.). TDOT. N-S 2-2118.

Cultural Resource Inventory, Sunflower River, Mississippi, Phases II-IV. USACE, Vicksburg District. DACW38-91-D-0017:12-14.

Archaeological Data Recovery, Area 5, Fig Island Channel Site, Savannah Harbor, Georgia (with Gulf Engineers & Consultants, Inc.). USACE, Savannah District. DACW21-92-D-0013:47.

Archaeological Survey of Compartment W-4 (438 acres), Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005:03.

Archaeological and Historical Survey of Knapp of Reeds Creek, Beaverdam Creek, and Forest Ridge Peninsula, Falls Lake, Granville County and Wake County, North Carolina. USACE, Wilmington District. DACW54-93-D-0032.

Archaeological Evaluation of the Heritage Park Blast Furnace Site, Joliet, Illinois. Illinois Department of Transportation. STPTE-00D1.

Underwater Archaeological Investigations, Washington Navy Yard, Anacostia Waterfront, Washington, D.C. (with Ecology & Environment, Inc.). U.S. Navy, Chesapeake Division, Norfolk, Virginia. N62477-91D0130.

1993 CONTINUED

Phase IB Cultural Resources Survey, Naval Station, Roosevelt Roads, Puerto Rico. The Environmental Company, Inc. LRA/0902.

Archaeological Survey of Compartment C-2 (1,024 acres), Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005:02.

Archaeological Data Recovery, Area 2, Fig Island Channel Site, Savannah Harbor, Georgia (with Gulf Engineers & Consultants, Inc.). USACE, Savannah District. DACW21-92-D-0013:45.

Documentation of the Civil War Vessels C.S.S. Florida and U.S.S. Cumberland at Hampton Roads, Virginia (with Law Environmental, Inc.). USACE, Mobile District. DACA01-92-D-0007.

Diver Hands-On Evaluation of Anomalies, Bight Channel Realignment, Savannah Harbor Deepening Project, Jasper County, South Carolina (with Gulf Engineers & Consultants, Inc.). USACE, Savannah District. DACW21-92-D-0013.

Professional Services for Two Archeological Data Recovery Areas at the San Juan National Historic Site, El Morro, San Juan, Puerto Rico. USACE, Jacksonville District. DACW17-93-R-0005.

Cultural Resource Investigations, Proposed Floating Casino and Small Boat Marina, Back Bay, Biloxi, Mississippi. G&S, Inc., New Orleans, Louisiana. S070

Underwater Archaeological Survey for Three Segments of Proposed Preferred Corridor for Replacement of Bonner Bridge, Dare County, North Carolina. Parsons, Brinckerhoff, Quade, and Douglas, Inc. 3301S124.

Relocation, Test Excavation, and Evaluation of the Mobley Strip Site, Fort Benning, Georgia. NPS, Southeast Region. 1443IB500093005:01.

Archaeological Reconnaissance Survey, Proposed State Route 15 Improvements, Somerville to Whiteville and Whiteville to Bolivar, Fayette and Hardeman Counties, Tennessee. Tennessee Department of Transportation (TDOT). 24004121404:050.

Magnetometer Survey and Diving in Discharge Area No. 1B, Galveston Entrance Channel, Galveston County, Texas (with Coastal Environments, Inc.). USACE, Galveston District. DACW38-91-D-0014: W012.

Data Recovery, S.S. Mary, and Assessment of Seven Anomalies, Corpus Christi Entrance Channel, Nueces County, Texas (with Coastal Environments, Inc.). USACE, Galveston District. DACW38-91-D-0014: W014.

Archaeological Assessment, Old Road Restoration/Development Project, St. Kitts, West Indies. Organization of American States. WSC09427.

Cultural Resources Inventory, Remainder of Repair and Replacements, Ouachita River Levees, Louisiana. USACE, Vicksburg District. DACW38-91-D-0017: W011.

Identification and Analysis of Historic Watercraft in the Shreveport, Louisiana to Daingerfield, Texas Navigation Project, Red River Waterway (with Coastal Environments, Inc.). USACE, Vicksburg District. DACW38-91-D-0014: W07.

Cultural Resources Inventory, Bayou Bodcau Reservoir, Louisiana. USACE, Vicksburg District. DACW38-91-D-0017: W09.

Archaeological Survey of the Proposed Highway 31 Corridor, Butler County, Alabama. (with Almon Associates). ALDOT. ST-1785-4.

Phase II Archaeological Investigations, Offshore Bryan Mound Strategic Petroleum Reserve, Freeport, Texas. Fluor Daniel, Inc. 622802-9-001K.

Phase III, Jefferson Street Bridge, Nashville, Tennessee. TDOT. 19957-1756-04.

Survey and Documentation of Meridian and Bigbee Railroad Bridge, Tombigbee River, Alabama. USACE, Mobile District. DACW01-92-P-1361.

Cultural Resource Survey, Enoree Ranger District, Sumter National Forest, South Carolina. U.S. Forest Service. 43-4670-2-0412.

Cultural Resource Inventory, Timber Cut Areas, Mississippi Lakes, FY93. USACE, Vicksburg District. DACW38-91-R-0017: W08.

Archaeological Reconnaissance Survey of the Proposed I-840 Corridor, Wilson and Rutherford Counties, Tennessee. TDOT. 98030-0170-04.

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1992 CONTINUED

Tennessee-Tombigbee Wildlife Mitigation, Mobile and Tensaw Deltas, Alabama. USACE, Mobile District. DACW01-92-P-1489.

Evaluation and National Register Nomination of Three Historic Shipwrecks, Lake Superior, Minnesota. Minnesota Historical Society. 92-C 2839.

Phase II Testing of Seven Sites within the Proposed Tom Bevill Reservoir, Fayette County, Alabama. Almon Associates.

Cultural Resource Inventory, Sunflower River, Phase I, Mississippi. USACE, Vicksburg District. DACW38-91-R-0017: WO6.

Diving on the J.D. Hinde (41LB85), Channel to Liberty, Liberty County, Texas. (with Coastal Environments, Inc.). USACE, Galveston District. DACW64-91-D-009.

Cultural Resource Survey, Edgefield and Tyger Ranger Districts, Sumter National Forest, South Carolina. U.S. Forest Service. 4304670-2-0405.

Phase II Archaeological Survey, Relocation of State Route 110 from I-85 Mitylene Interchange to Merry, Montgomery County, Alabama. Alabama Highway Department. F-393(9).

Research Design for Mitigation of the S.S. Mary, Port Aransas, Texas (with Coastal Environments, Inc.). USACE, Galveston District. DACW64-91-D-0009: WO10.

Tennessee-Tombigbee Wildlife Mitigation, Pascagoula Delta and Sharkey County, Mississippi. USACE, Mobile District. DACW01-92-P-1563.

Assessment of Seven Anomalies, Offshore Matagorda, Texas. K.C. Offshore, Inc.

Cultural Resource Inventory, Areas of Land Buys, Grenada & Arkabutla Lakes, Mississippi. USACE, Vicksburg District. DACW38-91-R-0017: WO7.

Remote Sensing Survey, Area South of Carolina Beach, Beach Nourishment Borrow Areas, Vicinity of Wilmington, North Carolina. (with GAI, Inc.). USACE, Wilmington District. 90-311-11.

Marine Archaeological Survey and Monitoring, Frederiksted Cruise Ship Pier, St. Croix, U.S. Virgin Islands. Virgin Islands Port Authority. 90IPM03912.

Cultural Resource Survey, Edgefield and Enoree Districts, Sumter National Forest, South Carolina. U.S. Forest Service. 43-4670-2-0346.

Cultural Resource Survey at Delta Mat Casting Field Additional Lands, Delta, Louisiana. USACE, Vicksburg District. DACW38-91-R-0017: WO5.

Relocation and Evaluation of Two Anomalies, Lavaca Bay, Texas (with Coastal Environments, Inc.). Engineering Science, Inc.

Various Cultural Resource Surveys, State of Mississippi. U.S. Soil Conservation Service. 53-4423-2-1972.

Cultural Resource Survey, Plot 296, Barren Spot, St. Croix, U.S. Virgin Islands. Hillside Properties, Inc.

Analysis of Remote Sensing Data, Proposed TRANSCO/Liberty Pipeline, Long Island Sound, New York. Alpine Seismic Survey, Inc. 8830.3021.

Cultural Resource Inventory, FY92 Repair and Replacements, Ouachita River Levees, Louisiana. USACE, Vicksburg District. DACW38-91-R-0017: WO4.

Cultural Resource Survey, Parcel 4, Estate Mount Welcome, St. Croix, U.S. Virgin Islands. Rural Housing Corporation.

Diving in the Port Mansfield Entrance Channel, Willacy County, Texas (with Coastal Environments, Inc.). USACE, Galveston District. DACW64-91-D-0009: WO9.

Phase I Submerged Cultural Resource Investigations, Bay Bridge Airport, Stevensville, Maryland. GAI, Inc.

Cultural Resource Survey, Two Weir Locations, Tchula Lake, Holmes County, Mississippi. USACE, Vicksburg District. DACW38-91-R-0017: WO3.

Phase II Evaluation, Site 1Wa101, Walker County, Alabama. PERC Engineering, Inc.

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Cultural Resource Inventory, Surplus Land, Wallace Lake and Bayou Bodcau Reservoir, Caddo and Bossier Parishes, Louisiana. USACE, Vicksburg District. DACW38-91-R-0017: WO2.

Underwater Investigations, Channel to Red Bluff, Jackson County, Texas (with Coastal Environments, Inc.). USACE, Galveston District. DACW64-91-D-009.

Phase I Archaeological Survey, Proposed Tom Bevill Reservoir, Fayette County, Alabama. Almon & Associates.

Assessment of Anomaly SR01, Salem River, New Jersey. GAI, Inc. 90-300-11.

Cultural Resource Survey, Armuchee District, Chattahoochee National Forest, Georgia. U.S. Forest Service. 43-435H-1-0489.

Phase II Archaeological Testing, Sites 40MI94 and 40MI 212, Marion County, Tennessee. Brown & Root, U.S.A., Inc. RE-0175-350-SC-003.

Cultural Resource Survey of Timber Cut Land, Four Lakes, Mississippi. USACE, Vicksburg District. DACW38-91-R-0017: WO1.

Underwater Archaeological Remote Sensing Sample Survey, Oregon Inlet Jetties, Manteo Bay Project, Dare County, North Carolina (with GAI, Inc.). USACE, Wilmington District. DACW54-91-0010: WO1.

Phase II Testing, Estate Manning Site, St. Croix, U.S. Virgin Islands. Virgin Islands Water and Power Authority.

Intensive Survey within Uwharrie National Forest, North Carolina. U.S. Forest Service. 53-4550-1-25.

Assessment of Suspected Shipwreck Remains, Offshore Mobile Bay, Alabama. Mobil Oil Corporation. 2430.02.

Magnetometer Survey and Ground Truthing of Anomalies, Corpus Christi Ship Channel, Aransas & Nueces Counties, Texas (with Coastal Environments, Inc.). USACE, Galveston District. DACW64-91-D-0009: WO1.

Cultural Resource Survey, Chattahoochee National Forest, Georgia. U.S. Forest Service. 43-435-H-1-0352.

Archival Research Related to 53 Properties on the Natchez Trace, Mississippi. NPS. PX55700100736.

Documentary Research, Atchafalaya Bay, Louisiana Shell Dredging Environmental Impact Study. DRAVO Basic Materials. 037.

Phase II Evaluation of Three Submerged Vessels within Chesapeake Bay, Maryland. USACE, Baltimore District. DACW31-89-D-0059.

Cultural Resource Survey, Proposed VIWAPA Substation, St. Thomas, U.S. Virgin Islands. R.W. Beck & Associates. C023.

Cultural Resource Surveys, Various Methane Gas Related Facilities, West Central Alabama. Metfuel, Inc.

Underwater Archaeological Investigations of a Submerged Wooden Structure, Pensacola Naval Air Station, Florida. U.S. Navy. N62467-87-C-0006.

Submerged Cultural Resource Investigations, Shipwrecks Madeira and Thomas Wilson, Lake Superior, Minnesota. Minnesota Historical Society. 91-C-2618.

Underwater Inspection of 25 Remote Sensing Targets, Asbury Park to Manasquan, New Jersey (with Alpine Seismic Survey, Inc.). USACE, New York District. DACW51-89-0016.

Phase III Mitigation of an Historic Danish Sugar Plantation, Mt. Welcome, St. Croix, U.S. Virgin Islands. Antilles Investment Corporation.

Phase IA Cultural Resource Survey, Lovango Cay, U.S. Virgin Islands. Glen Speer Construction.

Inspection of Seven Historic Sailing Vessels, Port Johnson, Bayonne, New Jersey (with Alpine Seismic Survey, Inc.). USACE, New York District. DACW51-89-0016.

Historic Properties Survey, Lake Okatibbee, Mississippi. USACE, Mobile District. DACW01-89-T-0231.

Phase IA Cultural Resource Survey, Plot 22D, Estate Plessen, St. Croix, U.S. Virgin Islands. Virgin Islands Housing Authority.

1991 CONTINUED

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1990 CONTINUED

Cultural Resource Survey, Low Head Dam Site and Associated Impact Areas, Birmingham, Alabama. Birmingham Water Works and Sewer Board. AL90-01315-U.

Phase II Cultural Resource Survey, Estate Dorothea, St. Thomas, U.S. Virgin Islands. D&C Development Corporation.

Phase II Evaluation, Submerged Schooner, Offshore Freeport, Texas. Tejas Power Corporation. 18902.

Phase II Evaluation and Documentation, Historic Shipways and Vessel Remains, Savannah River, Georgia (with the University of Tennessee, Chattanooga). Columbia-Sussex Corporation. S009.

Phase II Archaeological Investigations, Green Cay Plantation, St. Thomas, U.S. Virgin Islands. Green Cay Plantation, Inc.

Phase I Marine Archaeological Survey, Compass Point, St. Thomas, U.S. Virgin Islands. Compass Point Marina Management Corporation. 861PB-20786.

Literature, Archival, and Historic Review, Submerged Cultural Resources, Lower Pascagoula and Escatawpa Rivers, Mississippi. USACE, Mobile District. DACW01-89-P-1673.

Phase IA Cultural Resource Survey, Estate Emaus, Coral Bay, St. John, U.S. Virgin Islands. Virgin Island Survey and Engineering, Inc.

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Phase IB Cultural Resource Survey, Estate Mandahl, St. Thomas, U.S. Virgin Islands. Green & Associates.

Marine Archaeological Survey, Proposed Radisson Hotel Riverwalk Extension, Savannah, Georgia. Columbia-Sussex Corporation. S005.

Marine Archaeological Survey, Proposed Cruise Ship Facility, Frederiksted, St. Croix, U.S. Virgin Islands. Post, Buckley, Schuh, & Jernigan, Inc. 01-301.00

Phase I/II Archaeological Investigations, Estate Fortuna, St. Thomas, U.S. Virgin Islands. Virgin Islands Housing Authority.

Cultural Resource Survey, National Guard Armory Improvements, Orroyo, Puerto Rico. USACE, Mobile District. DACA01-89-P-1868.

Phase II Archaeological Investigations at Sugar Bay Plantation
Resort, St. Thomas, U.S. Virgin Islands. Krisch American Inns,
Inc. KHI289052.

Phase IA Cultural Resource Surveys, Estates Fortuna and Nazareth,
St. Thomas, U.S. Virgin Islands. Virgin Islands Housing Authority.

1989 CONTINUED

APPENDIX D
Presentation at Society for Historical Archaeology
Corpus Christi, Texas
January 1997

ROBERT M. ADAMS

The Future of Underwater Archaeology: A recovery device for retrieving submerged archaeological sites intact and the related excavation facility.

Since the advent of nautical archaeology in the early 1960s, little has changed in the formula in which the fieldwork, conservation, publication or funding of nautical archaeology is undertaken. George Bass published an article entitled "New Tools for Undersea Archaeology" in the September 1968 issue of the National Geographic Society magazine showing the use of airlifts, stereo photography and submarines as tools for underwater archaeology. The archaeological methodology, research objectives and the pattern to secure funding has progressed very little over the past 30 years and many of these tools are still being used today. This is a credit to those who pioneered the work and refined the methods and equipment in a few short years and an embarrassment to those of us who have not been diligent or insightful enough to significantly advance the field.

This paper presents an analysis of some of the basic tenants of underwater archaeology and presents a solution to the current shortcomings that have limited the expansion of the field. Among these shortcomings are the physiological limitations and environmental hazards, both of which can effect the quality and cost of the archaeological work. A second problem within the profession is the under-employment of those individuals who have already received specialized training. Finally, the method for fund raising for academic or institutional work has changed little over the years and this inability to raise funds for underwater archaeology work is a primary reason for the underemployment and the lack of underwater excavation. The future of underwater archaeology is in the expansion of the field to create a larger academic base, more and better employment, greater funding for research, increase in public understanding and participation, and the expansion

of underwater archaeology around the globe. The following method for conducting underwater archaeology, from excavation to publication, addresses many of these limitations.

Two of the limitations of nautical archaeology are the environmental and physiological constraints. Often, wrecks that are the subject of excavation are found in environments with extremely cold water temperatures, require decompression and have numerous environmental difficulties. Among the many environmental hazards or limitations are low to zero visibility and marine hazards including lion fish, stone fish and extremely high bacteria levels from untreated sewage at low tide. The risks associated with riverine wrecks include zero visibility, floating snags, water moccasins, alligators and snapping turtles large enough to take off your hand at the wrist.

Often the remote location of shipwrecks is a contributing problem or prohibitive factor. Isolated locations in foreign countries have inherent costs and difficulties that include logistical problems with transportation of personnel and equipment, government permits for multi-year excavations, and the possible change in political make-up during the life of an excavation which can jeopardize the project. Offshore locations necessitate the use of a boat that may be prohibitively expensive, and some wrecks are located beyond safe or practical diving limits.

These remote locations of shipwrecks and their underwater environment usually prohibits the public from experiencing or witnessing the excavation portion of underwater archaeology. To further isolate the general public from underwater archaeology, the work of analysis and conservation often takes place in isolated locations including distant research annexes, basements, abandoned fire stations or even in a castle dungeon far from the interested eyes of the public.

The impact of these difficulties, and the inability to raise sufficient funds to overcome these obstacles, has led to a stagnation in the employment market and under employment within the field.

A brief and admittedly unexacting review of the jobs involved with nautical archaeology in the United States shows a disappointingly few number of jobs. The review finds 19 State, 11 Federal, 13 Institutional and Museum, 21 University, 9 Corps of Engineers and 18 Contract jobs or positions. Many of these jobs or position are in review and compliance related to federal regulations or State laws and a number of the university positions are involved with nautical archaeology only at a cursory level. There are undoubtedly, jobs that I have overlooked and some that have been included clearly have very limited participation in nautical archaeology.

The number of individuals trained to undertake these tasks began to grow with the beginning of specialized training in the late 1970s at Texas A & M University (TAMU) and East Carolina University (ECU). Since the beginning of the TAMU and ECU academic programs it is estimated that 334 individuals have enrolled in the two programs and, to date, 179 have received their degrees (Angie Schaffer-TAMU : Karen Underwood-ECU 1996. pers. comm.). A brief review of the positions outlined above estimates that only 41 of those 91 positions listed are held by graduates of the two programs. A further review of the other 50 positions roughly estimates that 47 of the people holding these positions, or 94%, are between 40-50 years of age. This suggests that most of these positions may not become available for 15-25 years if these individuals retain these jobs until they reach the current retirement age of 65. This statistic, coupled with the current climate of academic and governmental downsizing and tenure insecurity in many academic institutions, suggests that an entirely different approach may be required to create stable employment positions in the future. This state of under-employment with its dim future suggests a need for a significant change to create more, high quality, stable jobs.

One of the basic limiting factors for underwater archaeological projects has always been the difficulty in securing funding. The more distant the project, the deeper the wreck, the more artifacts to conserve and research to conduct the more expensive will be the excavation and subsequent work.

It is important to remember that one of the basic tenants of archaeology is and has always been based on the thrill of "discovery", whether it is the artifact itself or the information gained from the excavation. This "discovery" that attracts and maintains funding comes, almost exclusively, from the excavation and rarely from the discoveries made during conservation or research. This principle of uncovering the unknown is the engine that drives archaeology and motivates or interests both the patrons and the members of the general public. The difference between the two is that the general public does not have the necessary disposable income to contribute the large sum required in the academic and institutional settings to finance excavations.

This structure of funding within an academic or institutional setting is usually governed by a single patron or more often by a few board members who have an avid interest and the income to support an expensive undertaking. The solution is to change the dynamic of the funding and reverse the current method of funding by a few individuals contributing 10' s of thousands of dollars to funding by millions of individuals, each contributing a few dollars.

To achieve this level of public interest there are five criteria that must be meet:

1. The shipwreck must be accessible by large numbers of individuals with minimal effort or expense.
2. The wreck must be visible, either underwater or in air, and at a reasonable distance to see the work being conducted.
3. There must be sufficient time for visitors to plan to visit the site and ideally, time for multiple visits.
4. There must be active archaeological excavation.
5. Preferably, there should be active diving.

The fifth and optional criteria is the fascination of seeing a person in a foreign environment, weightless, breathing underwater in unfamiliar equipment, performing a previously unknown task with the possibility of a new discovery at any moment. This fifth

criteria, combined with all of these other components forms a compelling combination for public visitation.

Over the past 35 years several projects, including the *Vasa*, *Mary Rose*, Roskilde and the Yorktown Shipwreck Archaeological Project, have had several of these factors but none, to date, have succeeded in combining all of these factors.

The solution to the environmental and physiological hazards, the remote locations, logistical difficulties and to meet all of the above criteria for public participation, is to remove the entire shipwreck site, with all its artifacts and surrounding sediment, to a controlled laboratory environment that has public access.

Experienced nautical archaeologists are aware that many wrecks are rarely preserved above the turn of the bilge, for a variety of reasons, and that shipwreck sites are most often planar in their dimensions with the cultural deposit limited to a depth of a meter or less. This limited level of preservation and depth of cultural deposit forms a relatively shallow site that can be recovered in its entirety with only a relatively minimal amount of volume.

To accomplish the task of removing an entire archaeological site, a mechanical lifting cradle has been designed to remove an area of 90 x 30 feet (27.4 m x 9.1 m) and with a maximum depth of six feet (approx. 2 m). A working prototype of one segment of the lifting cradle has been constructed of stainless steel, and polycarbonate that is actuated with hydraulic cylinders to demonstrate the principle. The actual full size cradle when used to a maximum sediment depth of four feet is estimated to have a carrying capacity of 146-219 tons (132-199 metric tons) displacement underwater. It must be remembered that this cradle with its contents is not intended to be lifted out of the water and therefore greatly reduces the weight and the consequent engineering.

Once the cradle has been actuated and the site has been encompassed, it is then lifted clear of the bottom by the lifting barge by standard lifting techniques and secured for transport. The barge is then towed to any seaside location in the world where an excavation facility has been constructed and is waiting to receive it.

The excavation facility consists of a large tank to hold the shipwreck site with filtered water and all the necessary equipment and surrounding facilities to take the archaeology from excavation to publication.

The key to the success of the project is to make all these processes and stages of archaeology visible and accessible to the general public. This allows the general public in large numbers, and at a minimal cost, to be the true patrons of the excavation.

The tank itself will have numerous viewing windows interspersed with exhibit cases displaying recovered artifacts and documentation. Interactive exhibits demonstrating the use of airlifts and remote operated vehicles (ROV), mapping exercises, and communications with the archaeologists while diving will bring the experience closer to the first hand experience. The public will also be able to see through the glass walls of the different facilities or laboratories including the diving equipment and machinery, the physical plant including filtration and the conservation laboratory, where they will see the active process of conservation. The curation facility will also be visible and will allow the public to see how artifacts are labelled and stored. The drawing room and library will show the preparation of site plans, the analysis of artifacts and the research and labor of publication.

The question that becomes apparent is: Where would such a facility be located and how many people would come to see it? The answer to these questions cannot be answered precisely without objective marketing research but, the author believes that with the proper selection of a wreck site, combined with the thrill of discovery, archaeology, diving, interactive exhibits and the educational aspects of seeing all phases of archaeology, exhibit will be produced of great interest to many members of the public. Particularly, if the experience is available at the same cost as a McDonalds combo meal or less.

It is clear that marine attractions from historic ships to aquariums has a strong audience appeal and can be seen in the fact that:

"In Boston the *USS Constitution* draws a million visitors each year, while Baltimore's inner harbor with its fleet of ships, has provided a focus for \$2 billion in public and private development" (Murphy 1988:56)

A more direct parallel is the historic Swedish warship *Vasa* that was salvaged from Stockholm harbor in 1961. Speaking of the recovery of the *Vasa*;

"Since then, (1961) the ship has become a decided monetary asset to Sweden. The Swedish tourism Board reported that, over the past seven years, the primary reason tourists came to the country was to see the historic, reborn ship, The *Vasa* is estimated to be worth \$275 million dollars a year to the national economy" (Murphy 1988:56)

A recent inquiry reports that the *Vasa* was visited by 770,000 visitors in 1995 and the current admission price is 50 crowns (\$7.35) which equates to an income of \$5,659,500 per year (Vasa Museum 1997. pers.comm.). Although, this ship is exceptionally well preserved and is a historically important vessel, it must be pointed out that it has no new artifacts, no diving, has few repeat visitors, no active excavation, and as a result, no new discoveries in the past 35 years.

The best and simplest location for an excavation facility is to locate it at an existing waterside facility that is an established tenant. These tenants include maritime museums and aquariums among other establishments. These facilities are already equipped with maintenance, administration, marketing, and education departments and have much of the necessary infrastructure. Most importantly, they have established and stable visitation. It is proposed that the aquarium is particularly well suited to the concept with its emphasis on underwater activity and the compatibility of the excavation facility with having sea life within the tank. The educational aspects are well suited to the aquarium with most aquariums having active educational programs.

As an example of a facility with all of these attributes, the National Aquarium in Baltimore, had a visitation in fiscal year 1995 of 1.63 million visitors (National Aquarium

in Baltimore-PR Dept. 1997. pers. comm.). If a \$3 admission were available for the excavation exhibit, either as an add-on or as an independent admission, the revenues generated each year of the excavation would be \$4,890,000. Over the estimated six year life of the excavation, the archaeology exhibit would generate a gross revenue of \$29,340,000. Even when the cost for 6-9 well paid archaeologist and conservators and the cost of the estimated \$1,000,000 facility are deducted, it can be seen that the revenues generated are substantial. It should be pointed out that these figures are gross revenues and do not account for any increase in visitation.

It must be remembered that there are hundreds of waterside aquariums or facilities around the world. Another example is the Tokyo Kasai Rinkai Aquarium that had a visitation of 2,208,525 in 1995 (Tokyo Metropolitan Government-New York Representatives Office 1996. pers. comm.). If an admission equal to 1/2 the price of a McDonalds combo meal in Tokyo were charged, or \$4, the gross revenues per year would be \$8,834,100. Over the estimated six year life span of the excavation, a total of \$53,004,600 would be generated.

It can be seen that the plan for recovering entire wreck sites is a financially viable concept. This process eliminates limited bottom times, poor visibility, dangerous marine life, extreme water temperatures, decompression hazards, short and long term physiological risks, cost of establishing distant base camps and transporting staffs. It also allows the public to view the work, schools to tour the facility and generates large sums of income from the public visitation. Additionally, each facility creates long term, stable, well paid employment for a number of archaeologists.

The impact of this process of conducting nautical archaeology has far reaching implications that include:

- The financial viability of these facilities will inspire entrepreneurs to offer joint ventures to investors which will diminish or change the market for treasure hunting schemes. (It must be remembered that for an excavation facility to be viable that

archaeology of the highest quality conducted by qualified individuals is an essential ingredient)

-It will eliminate the the depth limits within which a shipwreck can be excavated.

-Shipwrecks, when they are discovered, will have the highest value for future excavation only if they remain in pristine condition. Thereby, being the greatest deterrent to looting or disturbing sites that has become available to date.

-The slower and more precise nature of the controlled excavation will result in higher quality work and cause an immediate evolution to smaller and more precise excavation tools. In the future, the underwater tool kit will more closely resemble the tools of dentistry than the typical 4-inch sewer pipe airlift commonly used today.

-Finally, millions of people each year at each facility will experience underwater archaeology, in its entirety, from excavation to publication. They will also gain a first-hand knowledge and appreciation of their maritime heritage. Consider, that if only 10 of the nearly 282 aquariums around the world drew only 2 million visitors each year, within 10 years 200 million individuals will have been exposed first hand to the science of nautical archaeology.

I am looking forward to the positive effect on the employment situation and the advances and increase in the quality of scholarship in the field. For these two reasons alone, I consider it worth the effort to develop and implement the process described above.

In conclusion, it is time to expand our thinking and look to the future of underwater archaeology. I would like to close by asking you to seriously contemplate the question,

What would you do to improve nautical archaeology if your facility generated \$4-6 million dollars per year in net income?

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